National Conversion Pilot Project
Stage II

Interim Measure / Interim Remedial Action (IM/IRA) Decision Document

Revision 4
30 March 1995

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Acronyms

ALARA	As Low As Reasonably Achievable
APCD	Air Pollution Control Division
APEN	Air Pollution Emission Notice
AQCC	Air Quality Control Commission
CAA	Clean Air Act
CAPPCA	Colorado Air Pollution Prevention and Control Act
CAS	Condition Assessment Summary
CCT	contamination control technician
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation and Libility Act
CHWA	Colorado Hazardous Waste Act
COC	Contaminant of Concern
DCG	derived concentration guide
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EB	electron beam
ED	Economic Development
EPA	U.S. Environmental Protection Agency
H&S	Health and Safety
HEPA	high-efficiency particulate air
HIP	hot isostatic press
HVAC	heating, ventilation, and air conditioning
IAG	Interagency Agreement
IDC	item description code
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action
LDR	Land Disposal Restricted
LLMW	low level mixed waste
LLW	low level waste
LWTO	Liquid Waste Treatment Operations
M&O	Management and Operating
MSC	Manufacturing Sciences Corporation
MSDS	material safety data sheet

NCPP	**National Conversion Pilot Project**
NEPA	**National Environmental Policy Act**
NESHAPs	**National Emission Standards for Hazardous Air Pollutants**
NRC	**U.S. Nuclear Regulatory Commission**
NTS	**Nevada Test Site**
OSHA	**Occupational Safety and Health Administration**
PCB	**polychlorinated biphenyl**
PEL	**personal exposure limit**
PMO	**preventive maintenance operation**
PVC	**polyvinyl chloride**
RCA	**radiation control area**
RCRA	**Resource Conservation and Recovery Act**
RFETS	**Rocky Flats Environmental Technology Site**
RFFO	**Rocky Flats Field Office**
STEL	**short-term exposure limit**
TWA	**time weighted average**
VAR	**vacuum arc remelter**
VIM	**vacuum induction melting**
VOC	**volatile organic compound**
WSRIC	**Waste Stream and Residue Identification and Characterization**

1.0 Introduction

1.1 General Description of the Project

The mission of the National Conversion Pilot Project (NCPP) is "to explore and demonstrate, at the Rocky Flats Environmental Technology Site (RFETS), the feasibility of economic conversion at Department of Energy facilities." Economic conversion is the conversion of facilities and equipment owned by the Federal government to production of goods by private firms for profit. The NCPP mission is consistent with RFETS' current mission, which is to "manage waste and materials, clean up and convert the RFETS to beneficial use in a manner that is safe, environmentally and socially responsible, physically secure and cost effective." The NCPP was authorized in December 1993 by Secretary of Energy Hazel O'Leary to proceed in three distinct stages with a review and positive decision required at the end of each stage before proceeding to the next. The NCPP is being conducted through a Cooperative Assistance Agreement, which was signed April 1, 1994, between the U.S. Department of Energy (DOE) and Manufacturing Sciences Corporation (MSC).

NCPP is an important step in implementing the Rocky Flats ETS mission because conversion of RFETS (facilities) to beneficial use is specifically enunciated in the mission statement. This pilot project is the first step in defining how the Rocky Flats Field Office will implement that part of its mission.

The NCPP has been divided into three stages, with decision points at the ends of Stages I and II and periodically during Stage III, to help ensure careful consideration of project feasibility and the opportunity for feedback from Stakeholders. At the end of each stage, the project could be revised or terminated, and DOE will only proceed with the support of regulatory agencies and the acceptance of the community. This document describes the proposed activities for Stage II of the NCPP. It should be noted that the schedule for Stage II and the specific work performed in any given fiscal year will be affected by the availability of funding.

Stage I, which officially began on April 1, 1994, was the planning step in the NCPP where information concerning facilities proposed for conversion was assembled. This information pertained to building characterization and assessment activities and planning for cleanup, further characterization, and operational assessment activities. Stage I also included additional market analysis; the development of a staffing and training plan, a regulatory oversight plan, and support services agreements; and appropriate regulatory reviews for Stage II. A decision whether to proceed to Stage II was made following public outreach activities to obtain feedback on the project. Stage I was scheduled to take 90 days to complete at an estimated cost of $1 million. This stage was subsequently extended by three months to further discuss Stakeholder issues and address DOE Headquarters comments.

Stage II, the cleanup and declassification step designed to make the buildings ready for commercial operations, involves additional building characterization, building cleanup activities necessary to satisfy regulatory requirements, further equipment operational assessments, building

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infrastructure and equipment maintenance necessary to ensure protection of human health and the environment, declassification work, and some small-scale process verification activities in support of Stage III. Stage II will be administered under an Interim Measure/Interim Remedial Action Decision Document as explained in Section 1.2. During Stage II, MSC will hire up to 200 displaced RFETS workers to participate in the cleanup of the buildings. It is estimated that Stage II will cost approximately $44 million and last for a period of about two years.

Stage III, the private recycling phase, may recycle material that would otherwise become waste into usable products such as shipping container liners. Stage III may be implemented only after conducting a full and open competitive process to select a Stage III participant. As currently envisioned, it may have an initial five-year duration, employ up to 500 displaced or potentially displaced RFETS employees, and possibly require no further outlay of federal funds. If the decision is made to continue the project beyond its original five-year scope, a second five-year lease may be contracted.

1.2 Purpose of the NCPP IM/IRA Decision Document

RFETS is identified as a Superfund site on the National Priorities List. Consequently, remediation activities are to be carried out in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) under the auspices of the U.S. Environmental Protection Agency (EPA). An Interagency Agreement (IAG)has been entered into by DOE, EPA, and the State of Colorado. This IAG sets the RFETS plan and schedule for CERCLA activities and RCRA activities under the Colorado Hazardous Waste Act (CHWA). Although the NCPP is under the administrative controls of the IAG, the milestones and deliverables of the NCPP are not subject to penalties under the IAG. Under the IAG, IM/IRA Decision Documents are used to describe the proposed action. Once the public has been informed and the IM/IRA has been approved, the proposed action can proceed.

Interim Measure/Interim Remedial Action (IM/IRA) Decision Documents are typically used as a vehicle for contaminant mitigation, abatement, and/or risk reduction under CERCLA where there exists an imminent threat to the public or the environment. Although there is no imminent threat to the public or environment, the IM/IRA process is being used for the NCPP to establish and direct the achievement of a baseline for identified hazards that could allow the continued safe operations of the facilities by a private concern. Another reason for using the IM/IRA process is to solicit the public involvement for this project.

This IM/IRA Decision Document identifies interim remedial actions for removal of uranium and chemical contaminants of concern, such as beryllium and others, which have been used within the three buildings that are associated with the NCPP. The remedial actions are proposed, not for reasons of mitigating an imminent threat, but rather, to evaluate the feasibility of cleanup techniques and to baseline the buildings, for the attainment of a safe and healthy workplace allowing future operations by a private concern.

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This NCPP IM/IRA Decision Document addresses the proposed cleanup of three buildings at the RFETS. These buildings were previously used to fabricate metal components used in the production of nuclear weapons by the DOE. The NCPP will assess the feasibility of converting these former defense production facilities to recycle DOE metals. The cleanup activities presented in this IM/IRA Decision Document do not necessarily constitute the final remediation of these facilities. The cleanup activities are intended, however, to demonstrate the feasibility of building cleanup techniques and to prepare the facilities for operation by a private concern and serve as a quantifiable step toward final remediation. Other cleanup activities are planned and/or are in progress at RFETS, and have been considered in the planning of the NCPP. The interface between the NCPP activities and other cleanup activities is addressed in the report entitled "Interferences Between the Economic Development (ED) Building Interim Reuse Cleanup and Operational Activities and the Interagency Agreement (IAG) Remediation Activities." This report identified no interferences between the NCPP and other remediation work under the IAG. The Cooperative Assistance Agreement for the NCPP stipulates that there will be no interferences between the NCPP and other RFETS IAG activities.

An important point related to this IM/IRA Decision Document is the distinction between Stage II and Stage III. As previously stated, each of the NCPP stages requires a separate decision to proceed. The decision to proceed with Stage II does not necessarily mean that Stage III will be pursued. Additionally, Stage II, if pursued, will be performed by MSC, with the support of EG&G through the Site Support Services Memorandum of Agreement. If Stage III is pursued, this work will be performed by a successful bidder as the result of an open, competitive process.

Although the administrative decisions associated with Stages II and III are separate, a number of the technical decisions associated with Stage II are directly related to expected Stage III activities. For instance, one of the NCPP goals is to recycle material that would be disposed of as waste if the buildings were to be cleaned and not reused. This waste material includes some of the equipment in the NCPP buildings. Other equipment in the buildings will be used to perform the recycling. During Stage II, DOE must make decisions concerning which equipment to recycle (either as feedstock or to be free released) and which equipment to keep to perform the recycling.

There are other similar instances where Stage III activities affect Stage II decisions; however, only this example is presented here to clarify the influence of Stage III on Stage II. As a result of this influence, the IM/IRA Decision Document refers to Stage III activities in some discussions. These references do not mean that Stage III will automatically be pursued if Stage II is approved, nor that the details of the Stage III activities have been defined. These references should be viewed as consideration of the future Stage III needs (as currently perceived) during Stage II.

This IM/IRA Decision Document describes the current condition of the NCPP buildings from two perspectives. First, the results of the characterization work performed to date are presented to describe the current conditions in regard to the types and levels of contamination currently present in the buildings. Second, the working condition of the buildings and the equipment in them is presented to provide an indication of the work that will be required to ensure that the

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buildings and equipment are available for Stage II and Stage III activities. Section 2.0 of this document presents these current conditions.

The IM/IRA Decision Document next presents the proposed Stage II activities, also referred to as the Proposed Action. These activities are: (1) continued sampling for contamination, (2) the cleanup activities, (3) declassification activities that will allow more effective access to the buildings, and (4) process verification activities that will confirm the availability of the equipment to perform the recycling activities. Section 3.0 presents these proposed activities.

Contamination is present in the NCPP buildings; therefore, each of the Stage II activities will generate waste. Section 4.0 presents the approach for managing the waste generated from Stage II activities.

Section 5.0 provides a National Environmental Policy Act (NEPA) assessment of the Proposed Action and the No-Action Alternative. This assessment compares applicable NEPA values for the situations where the Proposed Action is performed to situations where no action is taken on the NCPP buildings.

Section 6.0 presents how public involvement is incorporated into the IM/IRA process.

1.3 Rocky Flats Environmental Technology Site Description and Background

The RFETS is located in northern Jefferson County, Colorado, approximately 16 miles northwest of downtown Denver (Drawing A-1). Appendix A includes copies of drawings referenced throughout this document. The site consists of approximately 6,550 acres of federally owned land in Sections 1 through 4, and 9 through 15, of Township 2 South, Range 70 West, 6th principal meridian. The RFETS property is approximately 3 miles (north-south) by 4 miles (east-west). Buildings are located within an area of approximately 400 acres, known as the RFETS Industrial Area. Drawing A-2 illustrates the Industrial Area surrounded by a buffer zone of approximately 6,150 acres.

The RFETS is a government-owned, contractor-operated facility. It is part of a nationwide complex that performed nuclear weapons research, development, production, and reprocessing in the past, and is administered by the DOE Rocky Flats Field Office (DOE-RFFO). The Management and Operating (M&O) contractor for the RFETS is EG&G Rocky Flats, Inc. The facility has been in operation since 1951, manufacturing components for nuclear weapons and conducting plutonium reprocessing. The RFETS fabricated components from plutonium, uranium, beryllium, and stainless steel. Historically, production activities have included metal refining, fabrication, machining, and assembly. Both radioactive and nonradioactive wastes were generated in the process. Current waste handling practices involve on-site and off-site recycling of hazardous materials and off-site disposal of solid radioactive wastes at other DOE facilities.

In 1993, the mission of the RFETS changed from the manufacturing and reprocessing activities mentioned above. The current mission of the site is to "manage waste and materials, cleanup and convert the RFETS to beneficial use in a manner that is safe, environmentally and socially responsible, physically secure and cost effective."

1.4 NCPP Facilities Description

The buildings that will be used for the NCPP were previously used to produce parts for nuclear weapons, before the RFETS mission changed. There are four building numbers associated with the NCPP: 444, 447, 865, and 883. Buildings 444 and 447, however, are contiguous buildings and are usually referred to as one building, Building 444/7. Thus, through most of this IM/IRA Decision Document, reference will be made to the three NCPP buildings. In some sections of this document, Buildings 444 and 447 are reported separately. This distinction is a result of the nature of the data being reported in a section and the differences in some building-specific data.

1.4.1 Building 865

Building 865 is located in the southeast area of the RFETS Industrial Area. Drawing A-3 is a plot plan showing the location of Building 865 in relation to other major buildings on the site. The building is a one-story structure with a floor area of 37,980 square feet. However, the shop area is a high bay, twice as high as the laboratory-office section. The shop area also has a small mezzanine floor. The building is primarily vertical, reinforced concrete twin-tee panels supported by a precast concrete framework. The laboratory-office portion is constructed of concrete block.

Building 865 has been primarily used for materials and process development operations. Operational capacities included metal rolling, shearing, forging, extruding, swaging, pressing, grinding, heat treating, vacuum-induction casting, and vacuum-arc casting. Inspection, testing, shipping, and receiving also took place in Building 865. The metals that were worked in the building were depleted uranium, various alloys of depleted uranium, tool steel, stainless steel, and aluminum. Beryllium and other metals were also worked in the building. Other less common metals such as gold, iridium, niobium, platinum, silver, tantalum, titanium, and tungsten were processed as required. No plutonium or enriched uranium was processed in the building.

The building function continues to be supported by several ancillary facilities. Building 827 provides emergency electrical power, Building 863 provides power for the extrusion press, Building 866 houses liquid effluent storage facilities, and Buildings 867 and 868 house exhaust fans and filters/plenums.

Drawing A-4 is a plan view of the layout of Building 865. The high-bay area contains the large metal working equipment such as the rolling mill, extrusion press, hydraulic press, and machine shop. The laboratory-office area contains administrative offices, a maintenance shop, and a metallographic laboratory.

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1.4.2 Building 883

Building 883 is located adjacent to Building 865 (Drawing A-3). Building 883 is a combined one-and two-story structure with a partial basement and a floor area of 52,350 square feet. The interior areas of the two-story portion of the building are high bays. There are only three, relatively small, second-floor areas. The building is primarily constructed of steel framework covered with corrugated asbestos cement or galvanized steel paneling.

Building 883 was used primarily for manufacturing and metallurgical operations. Operational capabilities included rolling, shearing, forging, pressing, welding, heat treating, cleaning, and weighing. Inspection, testing, shipping, and receiving also took place in Building 883. The metals worked were primarily depleted uranium, an alloy of uranium and niobium, stainless steel, and aluminum. Beryllium and other metals were, on occasion, worked in Building 883. No plutonium was processed in the building. From 1957 until 1966, enriched uranium was processed in Building 883. Building 827 (emergency generator) also supports Building 883.

The plan view of Building 883 is shown in Drawing A-5. The central area of the building houses electrical generators and power panels for the metal processing equipment located on either side in the A and B sides of the building. The A side contains a rolling mill, lathes, presses, and furnaces. The B side houses mills, a press, and some minor metal processing equipment. The B side also includes a uranium storage area and several small rooms. The basement houses small items of equipment and a number of effluent handling vessels. Offices are located on both the first and second floors.

1.4.3 Building 444/7

Building 444/7 is located in the southwestern portion of the RFETS as shown in Drawing A-3. The Building 444/7 plan view is shown in Drawings A-6, A-7, and A-8. Building 444 is basically a single-story structure with a smaller second floor (mezzanine) and basement. Most of Building 444 consists of concrete columns and tie beams supporting reinforced concrete exterior walls and roof. Other areas of the building have various combinations of concrete, concrete block, structural steel, corrugated asbestos cement, and corrugated steel. Building 447 is corrugated asbestos cement on structural steel framing. Building 444 has a floor area of more than 100,000 square feet. Building 447 has a floor area of more than 18,000 square feet.

Building 444/7 (and supporting buildings) were used for general metal fabrication and included a foundry and associated fabrication facilities, precision machine shops, tool engineering, production control, and non-destructive testing. Building 444/7 was capable of arc melting, induction casting, heat treating, electropolishing, precision machining, tool grinding, jig and fixture making, carbon mold machining, plating, cleaning, and assembling. Materials processed included depleted uranium, depleted uranium alloys, beryllium, aluminum, tool steels, special stainless steels, and graphite. Inspection, testing, shipping, and receiving also took place in Building 444/7. No plutonium or enriched uranium was processed in the facility. Building 447 contains a laboratory, beryllium heat treating area, and uranium casting area.

Support buildings for Building 444/7 include Building 427 - emergency generator, Building 446 - guard station, Building 449 - paint/oil storage, Building 453 - oil storage, and Buildings 454 and 457 - cooling towers.

2.0 Current Conditions

Section 2.0 describes the conditions present in the NCPP buildings. It was necessary to document the current conditions, as accurately as possible, before Stage II activities could be planned. The Stage II activities include cleaning the buildings and equipment to agreed-upon levels, declassifying tooling and parts to allow more ready access to the buildings, dismantling/removing equipment, packaging waste, and verifying the availability and compatibility of the recycling equipment. Based on these planned activities, the current condition of the buildings and equipment was researched from two perspectives. The types and levels of contamination currently present were determined, as accurately as possible, to ascertain the levels of cleanliness possible and the methods to be used to achieve those levels. Also, the current working condition of the building systems and the equipment was assessed to determine which equipment may be used for recycling and what maintenance work was required to ensure the availability of the buildings and equipment. These efforts also included the identification of the tooling and parts that will be declassified to provide more ready access to the buildings for other Stage II activities.

None of the Stage II activities is entirely independent of the others. That is, classified tooling cannot be declassified without considering the contamination present in the area and the working conditions of the building systems and equipment used in declassification. Similarly, to decontaminate a piece of equipment, one must determine if the equipment is classified, requiring cleared personnel to perform the decontamination, and whether the building systems needed to support the decontamination are available. Based on these interdependencies, the current condition of the buildings is presented in the following categories:

- Beryllium Characterization Results
- Radiation Characterization Results
- Other COCs
- Environmental Hazards
- Building Safety Systems
- Building Systems Assessment Results
- Equipment Conditions
- Classified Parts/Tooling
- Physical Hazards

2.1 Beryllium Characterization Results

Beryllium is a lightweight metal, which is two-thirds as dense as aluminum and one-quarter as dense as steel. It is as strong and four times as stiff as aluminum and twice as stiff as steel. Beryllium is not radioactive but is often used in nuclear applications because of its ability to reflect neutrons. Beryllium is also used in aircraft and spacecraft components to save weight, such as in gyroscopes and window and door frames in NASA's space shuttle. Other modern uses include windows in x-ray equipment and electronic components (as an alloy with aluminum). Solid beryllium is not hazardous, but beryllium dust can cause "chronic beryllium disease" if inhaled by an individual susceptible to the disease. The RFETS and MSC's facility in Tennessee both provide worker protection and monitoring programs to minimize this hazard.

In the past, beryllium was processed in the NCPP buildings to produce weapons components. Consequently, the nature and extent of the contamination within the buildings was ascertained. For each of the NCPP buildings, existing beryllium survey data were gathered and analyzed to qualitatively assess the nature and extent of beryllium contamination. Table 2-1 summarizes the beryllium survey data that were assessed during Stage I.

In the past, RFETS practice has been to use a contamination cutoff value for determining whether a surface contains beryllium contamination. This cutoff value is 25 $\mu g/ft^2$ (2.7 $\mu g/100\ cm^2$). If a surface has been sampled and beryllium contamination observed is above this value, it is considered contaminated. If a surface has been sampled and beryllium contamination is not observed to be as high as this value, it is considered clean.

This value of 2.7 $\mu g/100\ cm^2$ will be used as the level to which all beryllium contamination will be cleaned. In accordance with the NCPP's As Low As Reasonably Achievable (ALARA) principle, surfaces will be decontaminated to lower levels of contamination. The cleanup values will be attained using the cleanup techniques; additionally, cleanup activities will strive to decontaminate beryllium levels to the NCPP target of one-tenth the cleanup value (or 0.27 $\mu g/100\ cm^2$). Since the NCPP ALARA value is specific to the project, and the data were previously collected for various reasons, it is not possible to identify the number of samples above the ALARA values. See Section 3.2.1 for further discussion of the NCPP ALARA program.

2.1.1 Building 865 Beryllium Results

Beryllium surveys were taken in Building 865 during the 1993 building baselining effort. Table 2-1 summarizes the results of this work. Of the beryllium surveys taken in this building, the only elevated values were noted in the vicinity of the 1,750-ton extrusion press and in the vicinity of the machine shop lathes. The data indicate that only nine elevated samples were found of 6,531 samples taken. The data collected in this building were difficult to interpret because the maps of survey areas, coupled with incomplete descriptions of actual areas sampled caused a high level of uncertainty about where the samples were taken. The baseline surveys included overheads in the building fixtures, such as the tops of fluorescent lights, cabinetry, and the ceiling. These surveys were taken with the perception that if contamination is present on these surfaces, it was initially airborne. In this building, production equipment and process knowledge were not used in determining survey points. Survey points were randomly determined in this building; therefore, individual pieces of equipment had not been prioritized during sampling to specifically characterize them. General knowledge of the building levels of contamination is obtained this way, but specific information about machinery used to process uranium and beryllium and associated radiological and toxicological contamination is not known.

Table 2-1 Beryllium Survey Summary

Survey Type	Total Number of Samples [d]	No. Beryllium Samples >Det. Level and <1.07 μg/100 cm^2	No. Beryllium Samples >1.07 μg/100 cm^2 and <2.15 μg/100 cm^2	No. Beryllium Samples >2.15 μg/100 cm^2 and <2.7 μg/100 cm^2	No. Elevated Beryllium Sample Results[a] (>2.7 μg/100 cm^2)	Locations of Elevated Sample Values
Building 865						
Special Be Smear Surveys	667	223	11	0	7	1,750-Ton Press Area, Room 145
Routine Be Smear Surveys	2,912	16	4	0	2	Machine Shop, Room 136
Routine Fixed Airhead Be Sampling Surveys[b] (>0.0005mg/m^3)	2,952	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No samples above the plant action level noted
Building 883						
Special Be Smear Surveys	1,549	400	10	0	2	Thermolyne Furnace, Room 104
Routine Be Smear Surveys	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Known[c]
Routine Fixed Airhead Be Sampling Surveys (>0.0005mg/m^3)	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Known
Building 444/7						
Special Be Smear Surveys	957	787	16	0	13	Lathes in Room 101
Routine Be Smear Surveys	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Known
Routine Fixed Airhead Be Sampling Surveys (>0.0005mg/m^3)	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Yet Evaluated	Not Known
Total Number of Samples	9,037	1,426	41	0	24	

[a] Based upon the standards identified in Health and Safety Practices Manual, Procedure No. 13.04.
[b] Airhead sampling for beryllium in Building 865 was suspended in September 1991 due to internal policy changes.
[c] Since the routine beryllium surveys were not yet evaluated in these buildings, it is not known if an area of beryllium contamination exists past the special surveys taken.
[d] Samples not reported in the following columns are below the detection limit.

2.1.2 Building 883 Beryllium Results

The quality of the beryllium survey data in this building is good because the surveying was prioritized toward equipment in the Radiation Control Area (RCA) of the building. This prioritized sampling method gives a relative understanding of gross beryllium contamination levels of the equipment and buildings, because it ensures that greater numbers of samples are actually taken on pieces of equipment that were the contact points for the production materials: uranium and beryllium. Greater numbers of samples taken on this equipment correlate to greater certainty of the actual equipment contamination levels. Therefore, it will be much easier to ascertain the necessary decontamination needs for this machinery as compared to Building 865. Additional data were taken on the tops of shelves and in the high-bay of the building. In these areas, no elevated values were observed regarding beryllium, indicating that it is unlikely that beryllium was airborne in the building. Areas surveyed included the insides and tops of cabinets, outer surfaces of electrical control boxes, floors, walls, and overhead areas. The rolling mills and the enclosed spaces underneath them were also sampled for beryllium. Within this building, the Theromolyne furnace is the only piece of equipment that demonstrated elevated beryllium contamination levels.

2.1.3 Building 444/7 Beryllium Results

The quality of the beryllium smear survey data in this building is good because the surveying was prioritized toward equipment in the building, based on the building's operational history. This biased sampling method provides greater certainty of the actual equipment contamination levels, as discussed in Section 2.1.2. The 13 elevated sample values observed were taken on five lathes, which are located in Room 101 of Building 444/7. In these areas having elevated contamination values, some degree of decontamination has already occurred under the supervision of the M&O contractor's Industrial Hygiene department.

2.1.4 Beryllium Assessment Limitations

For the characterization work on beryllium contamination, two limitations have been identified. The limitations are identified in this section; however, the resolution of these limitations is discussed in Section 3.0. One limitation identified regarding these data is that the methods of collection have been prioritized differently in different buildings. Although differing sampling priorities exist between buildings, the data gathering methods (techniques used to sample) remained consistent between the buildings. Smears were taken in each of the buildings following the M&O contractor's approved procedure. The identified sampling differences between buildings were a result of two differing sampling strategies (choice of sampling sites) being employed. In Building 865, beryllium data were taken at random locations and were in conjunction with radiation survey data. In contrast, within the remaining buildings, beryllium survey data were taken with a priority toward sampling the building equipment that handled beryllium and its supporting equipment, instead of taking random samples. This prioritized strategy is the preferred strategy.

The second limitation is that all survey data have not yet been evaluated. Continued evaluation of routine beryllium survey data will be performed as the data become available.

2.2 Radiation Characterization Results

Depleted uranium, or U-238, is a low-level radioactive metal. It is a by-product created when natural uranium ore is processed to extract the isotope U-235 for nuclear fuel. Depleted uranium is very dense, being 70% heavier than lead. This makes it an excellent shield to absorb radiation, and it is widely used in the medical industry to store radioactive sources. This property also makes it a candidate material for shielding spent nuclear fuel and other radioactive wastes in transportation and storage. Depleted uranium's slight radioactivity requires some of the same aspects of a radiological protection program as other radioactive materials; however, the primary health risk is its effect as a heavy metal if ingested or inhaled in dust form. Its radioactive nature makes it easy to monitor in the workplace.

Within the NCPP buildings, the M&O contractor had collected depleted uranium data for the purpose of providing baseline data. In this report, an evaluation of these data is addressed. Depleted uranium contamination was measured in several different ways; therefore, these values have been identified as "radiation samples." The regulatory standard for free release that will be met by the NCPP is 1,000 dpm/100 cm^2 removable α or 1,000 dpm/100 cm^2 removable β/γ contamination. This is the value found in both the DOE Radiological Control Manual and the U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.86. Like the cleanup of beryllium, the NCPP will attempt to clean radiological contamination to a more stringent cleanup target under its ALARA program. The radiological cleanup target value is one-tenth the regulatory standard (or 100 dpm/100 cm^2.) In those instances where is it feasible, contaminated items will be cleaned to the target value; however, in all cases, items will be cleaned to the regulatory standard. The results of the radiological characterization efforts to date in the NCPP buildings are summarized in Table 2-2. The depleted uranium survey data for each building are discussed in the following sections.

Table 2-2 Radiation Survey Summary

Survey Type	Number of Radiation Samples Taken	Number of Elevated Sample Values[a] (>100 dpm/100 cm^2)	Locations of Elevated Sample Values
Building 865			
Alpha Radiation (Removable)	2,855	1,428	Rooms 136 and 145: 1,750-Ton Extrusion Press Area
Alpha Radiation (Fixed)	2,997	600	Room 145 Southeast Corner
Beta Radiation (Removable)	2,850	14	RCA, Majority in Southeast Corner of Room 145
Beta Radiation (Fixed)	2,664	13	Selected Areas of Room 145
Building 883			
Alpha Radiation (Removable)	1,549	341	B-mill and B-mill Pit
Alpha Radiation (Fixed)	Not Yet Evaluated[b]	Not Yet Evaluated	Not Known[c]
Beta Radiation (Removable)	1,549	565	Underneath B-mill, Underneath A-mill, in Erie press area
Beta Radiation (Fixed)	Not Yet Evaluated	Not Yet Evaluated	Not Known
Building 444/7			
Alpha Radiation (Removable)	310	6	Overhead in Room 201
Alpha Radiation (Fixed)	Not Yet Evaluated	Not Yet Evaluated	Not known
Beta Radiation (Removable)	310	9	Overhead in Room 201
Beta Radiation (Fixed)	Not Yet Evaluated	Not Yet Evaluated	Not Known
Total Number of Samples	15,084	2,976	

[a] Based upon standards identified in Health and Safety Practices Manual, Procedure No. 18.10.

[b] Although smear surveys were collected, fixed contamination surveys were not included.

[c] The direct radiation data were not evaluated; therefore, it could not be determined where elevated values would occur. These areas are therefore "Not Known."

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2.2.1 Building 865 Radiation Results

In Building 865, the majority of the measurable contamination found in the building appears to be elevated alpha and beta removable radiation. These radiation types were found in highest quantities in the area of the Bullard vertical turret lathe and the extrusion press. Other elevated smear samples were observed in that specific area (the southeast corner) of the high-bay.

2.2.2 Building 883 Radiation Results

Empirical observation of all recorded data values for this building indicated that for radiation types observed (namely alpha removable, alpha fixed, beta removable, and beta fixed), comparative values of beta radiation were substantially higher than alpha radiation. This observation indicates that it is more likely that enriched uranium was milled on certain pieces of equipment. The data confirm that there was contamination underneath the A-mill, where depleted uranium was reported to have been milled, and in the Erie press area. The area of the building with the most elevated survey results appears to be the enclosed space underneath Rolling Mill B.

2.2.3 Building 444/7 Radiation Results

Until more data regarding the removable radiation levels from this building have been analyzed, the total radiological condition of the building is uncertain. However, of the samples observed in the RCA of this building, only a small percentage of the values recorded are above 100 dpm/100 cm^2 alpha. For beta removable contamination, the same conclusion appears to be appropriate based upon available information. Although, the uranium chip roaster is known to be contaminated, the data are not included in this analysis.

2.2.4 Radiation Assessment Limitations

One limitation identified during the assessment is that surface radiological contamination levels as a result of the presence of depleted uranium may be suspect because smear samples collect only surface contamination. In the past, it has been industry practice to paint over fixed contamination, leaving the contamination under the paint barrier undetectable. This practice, although performed to prevent the spread of contamination, makes obtaining an objective radiological characterization of the building more difficult, and there is the added uncertainty of contamination under painted surfaces. As discussed in Section 3.0, this limitation will be resolved in Stage II.

2.3 Other COCs

Beryllium and depleted uranium are substances that have physical properties known to be hazardous to human health. For the NCPP, these two substances are the primary Contaminants of Concern (COCs). Additionally, enriched uranium is a potential COC in Building 883 because is was processed in the building before 1966. During production operations in these buildings, other chemicals were used in support of production. These chemicals appear on chemical inventory lists for each building. Although, under the Site Support Services Memorandum of Agreement, all excess packaged chemicals will be removed by the M&O contractor prior to the commencement of hands-on work, residues of these chemicals in production areas are potential other COCs in the production areas. Systematic sampling for these other COCs has not yet been performed. The plans for obtaining data on the presence of these other COCs are discussed in Section 3.1, Sampling.

Several other COCs have been identified as potentially being present in the NCPP buildings by researching the Historical Release Report for Individual Hazardous Substance Sites (IHSSs) in the general area of the NCPP buildings. It was initially concluded that if these materials were spilled outside the buildings, they had been used within the buildings during operations. A preliminary comparison of these potential COCs to the inventories within the buildings demonstrates that each of these potential COCs was present in the inventories of the buildings. A disadvantage of the potential COC list is that it is a list of chemicals found in and outside all of the NCPP buildings, and not a list of potential COCs by building. Appendix B is a list of potential COCs for all the NCPP buildings.

To effectively and efficiently manage the sampling, the list of COCs for each building will be refined to retain only those COCs with a reasonable probability of being present and exclude those COCs that have not demonstrated a reasonable probability of being present. The method of refining the list of other COCs is presented in Section 3.1, Sampling.

2.4 Environmental Hazards

Environmental hazards are those identified as having the potential to cause environmental damage as well as regulatory violations. Examples of environmental hazards include tanks and associated equipment that are used to temporarily store and transfer liquid hazardous wastes, and drum storage areas. Used high-efficiency particulate air (HEPA) filters are also considered environmental hazards, since the HEPA filter's function is to trap particulates, some of which may contain radionuclides or other hazardous constituents.

As a result of the age of the NCPP buildings, there are piping, equipment, and structural components within the buildings that contain asbestos. To date, there has been no systematic program to identify and remediate the asbestos-containing materials. However, Stage II the asbestos-containing materials in the NCPP buildings will be identified and managed to ensure the health and safety of the public and the workers. Section 3.1, Sampling, contains a discussion of how asbestos will be handled. A brief discussion of the building-specific environmental hazards follows.

2.4.1 Building 865 Environmental Hazards

IHSS 179 is a former hazardous and possibly radionuclide material drum storage area located in the north end of Room 145. IHSS 179 is one of six IHSSs regulated as Operable Unit 15 under

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the IAG negotiated among DOE, EPA, and the Colorado Department of Health and Environment (CDPHE). The dimensions of the IHSS are approximately 8 feet by 12 feet (Drawing A-9). The sampling for radionuclides and COCs has been completed. The sampling data, which has been validated, indicate that there are no RCRA hazardous constituents. This IHSS will be clean closed under RCRA before NCPP cleanup begins. Rinsate shows no radioactive contamination. There is no beryllium source within the IHSS. This IHSS will be included in the Stage II radiation and beryllium cleanup and will be cleaned as necessary to the NCPP project cleanup values.

The process waste lines within the building meet the RCRA requirements. Some of the ancillary equipment does not have secondary containment or lacks secondary containment alarms. However administrative controls (including daily inspections of ancillary equipment and the tanks) are in place. These administrative controls are acceptable measures under RCRA to allow the use of the equipment. In addition, the sump in Room 145 has been disconnected. To bring the sump back on line, a high-level alarm must be installed and a short section of threaded metal piping must be replaced. Refer to Section 3 for a more detailed discussion of the proposed action for resolving the identified hazards.

A transformer containing polychlorinated biphenyls (PCBs) is located in Building 865. Under 40 CFR 761, the transformer requires quarterly inspections with at least 30 days between inspections. These inspections will continue to be conducted by the M&O contractor in accordance with the Site Support Services Memorandum of Agreement.

2.4.2 Building 883 Environmental Hazards

IHSS 180 is a drum storage area located in Room 104 that measures approximately 10 feet by 16 feet (Drawing A-10). IHSS 180 is presently an active low level waste drum storage area. At one time, this area was used to store RCRA wastes. IHSS 180 is included in Operable Unit 15, regulated under the IAG negotiated among DOE, EPA, and CDPHE. Surface contamination data have been collected for IHSS 180 as part of the Operable Unit 15 program. The sampling data, which has been validated, indicate that there are no RCRA hazardous constituents. This IHSS will be included in the Stage II radiation and beryllium cleanup and will be cleaned as necessary to the NCPP project cleanup values.

The liquid process waste system does not meet regulatory requirements and has been temporarily taken out of service. All piping is valved off, and the process waste drains are capped. This system will be left in its out-of-service condition during Stage II until it has been upgraded to meet applicable regulations. Refer to Section 3 for a more detailed discussion of the proposed action for resolving the identified hazards.

2.4.3 Building 444/7 Environmental Hazards

The Building 444/7 process waste tanks and ancillary tanks are in use and will require routine inspection and sampling. Some of the process waste lines in Building 444/7 have been listed as out of service. These waste lines either do not have secondary containment or have screw-type fittings. In addition, most of the drains are temporarily sealed with a cement plug. Compensatory measures such as daily inspections of tanks and ancillary equipment will be used as necessary.

The Original Uranium Chip Roaster, IHSS 204, (Drawing A-11) is located in Building 444/7 in Rooms 32 and 502. Uranium metal chips were oxidized to stable uranium oxide in the roaster. It is included as an IHSS in Operable Unit 15. This IHSS has been sampled, and samples were taken and analyzed for RCRA hazardous constituents. The sampling data, which has been validated, indicate that there are no RCRA hazardous constituents. This IHSS will be included in the Stage II radiation and beryllium cleanup and will be cleaned as necessary to the NCPP project cleanup values.

Sanitary sewage lines in the RCA of Building 444/7 are in the process of being permanently sealed. This work will be completed prior to the initiation of Stage II activities in this building. Refer to Section 3 for a more detailed discussion of the proposed action for resolving the identified hazards.

2.4.4 Environmental Hazards Assessment Limitations

There were few limitations to the assessment of environmental hazards described. The record of IHSSs, coupled with records of activities and IAG-identified environmental hazards surrounding these buildings, made this assessment complete. Additional environmental hazards assessment will occur in Stage II so that currently unidentified environmental hazards are properly dispositioned.

2.5 Building Safety Systems

In accordance with the Site Support Services Memorandum of Agreement, the building safety systems will be maintained by the M&O contractor during Stage II of the NCPP. The building safety systems are the structures, equipment, and components that reduce the possibility and mitigate the consequences of accidents due to operations in the building. The safety systems consist of administrative and engineered controls. No maintenance needs were identified for any of the NCPP building safety systems.

2.6 Building Systems Assessment Results

During Stage I, an assessment was made of the structures, systems, and components within the NCPP buildings. This assessment was performed to determine, to the extent possible, the repair and/or maintenance required to make them available for use during Stage II. This assessment consisted of reviewing the M&O contractor's Condition Assessment Summary (CAS) reports and maintenance records, "walking down" each building, and interviewing operating and maintenance personnel who had worked in the buildings in the past. Personnel from the company that had designed the heating, ventilation, and air conditioning (HVAC) systems for two of the buildings were also interviewed.

The assessment considered the structures, systems, and components for use in Stage II activities and possible future use in Stage III operations. During the assessment, each of the three NCPP buildings was evaluated. This evaluation included the building structures, 577 major pieces of equipment, and 76 miscellaneous rooms containing numerous pieces of smaller items such as tools and office equipment. The structures were evaluated to determine their condition and to identify any maintenance items needing correction prior to use for Stage II.

Maintenance items identified in building systems that will be retained for use are listed in Tables 2-3, 2-4, and 2-5. The maintenance items are divided into three categories:

- High Priority Action I - Items concerned with worker safety and primary environmental controls
- Medium Priority Action II - Items that improve the functionality of the building or add additional assurance environmental protection
- Low Priority Action III - Items that improve the appearance of the building or aid in maintaining the building cleanliness

Section 3 contains a discussion of the proposed actions for Stage II. All Stage II work will be performed in accordance with the NCPP Health and Safety Program.

Table 2-3 Building 865 Structure and Systems Maintenance Items

Item #	Maintenance Item	Action
1	Air supply fans for the HVAC are located over the RCA. The intake should be relocated to a less suspect area.	I
2	Cooling towers need rebuilding to remove both asbestos and bacteria. Contractor is Karley Co., Kansas City, MO. DOE's concern over asbestos has delayed project.	I
3	Some doors in the building are not fire rated due to penetrations of sign holes and windows.	I
4	Cracked coupling in the health physics vacuum lines may affect flow of air through the sample filters.	II
5	The steam heating system shows signs of corrosion. Preheating coils need replacement. Same problem in Building 883.	I
6	Floor surfaces are damaged in the annex.	I
7	Domestic hot water system needs evaluation.	I
8	The roof to wall joint between the main building and annex (Room 172) allows rain and snow to leak within the RCA. This presents a contamination control problem.	II

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Item #	Maintenance Item	Action
9	Repair and upgrade process waste system for use with non-hazardous waste water.	I
10	Berm the exit doors and seal the wall and floor joints of the building to contain contaminated water from a fire sprinkler head release.	II

Table 2-4 Building 883 Structures and Systems Maintenance Items

Item #	Maintenance Item	Action
1	C Side requires new preheat coils because the ammonia in the steam line has attacked the copper coil and brass valves. A and B side coils were recently replaced with steel coils that resist the ammonia but will corrode with the air in the lines and last about 10 years. A substitute material is needed.	II
2	The demister filter brackets on the exhaust of C side are badly corroded.	I
3	Doors in the building are not fire rated due to penetrations of sign holes and windows.	I
4	Repair and upgrade process waste system for use with non-hazardous waste water.	I
5	Improved industrial floor lighting.	II
6	Berm the exit doors and seal the wall and floor joints of the building to contain contaminated water resulting from fire sprinkler head release.	II

Table 2-5 Building 444/7 Structure and Systems Maintenance Items

Item #	Maintenance Item	Action
1	The prefilters on the air intake of the HVAC system have been removed because the filters plug and shut off the air supply during snow storms. To repair the system, the intake hooding must be extended and a heater added before the filter or the filters moved behind the steel heating coils. With the filters behind the heating coils it will be necessary to clean the coils periodically.	I
2	Only one fan is exhausting air from Building 444. The others are not functioning because the vanes are stuck shut.	I
3	The plating lab still has chemical residue left in the tanks. The M&O contractor is scheduled to remove the chemical inventories from the building under the MOA.	I
4	Room 501 has loose material that may contain asbestos.	I

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Item #	Maintenance Item	Action
5	Repair and upgrade process waste system for use with non-hazardous waste water.	I
6	EG&G Facility Engineering is designing berms for each building exit to contain any radiological spill.	I
7	Create a separate vacuum induction melting (VIM) area to melt beryllium. Utilize the existing air supply system of the 444 plating lab and increase the furnace hooding. Prepare plating lab for mold coating for beryllium casting.	II

2.7 Equipment Conditions

At the time the building systems were assessed, the equipment in the NCPP buildings was evaluated. The evaluation was performed to determine the equipment applicability to Stage II operations and to identify any maintenance items that need to be corrected prior to Stage II. The same maintenance item categories that were used for the building systems were used for the equipment, namely:

- High Priority Action I - Equipment that needs repair to perform either the cleanup or declassification activities in Stage II
- Medium Priority Action II - Equipment needed during Stage II to fabricate prototype parts in process verification activities
- Low Priority Action III - Deficiencies on equipment that may or may not be used during stage III. Decision to proceed or cancel these deficiencies will occur late in Stage II

Maintenance items identified in the equipment are listed in Tables 2-6, 2-7, and 2-8.

Table 2-6 Building 865 Production Equipment Maintenance Items

Item #	Maintenance Item	Action
1	ABAR vacuum furnace has a vacuum leak, probably in the door or heating element that passes through seals.	I
2	Vacuum induction melting furnace needs rebricking before operating because lack of operation and no vacuum has introduced water in the bricks. Note: this work involves potential asbestos and heavy metal contamination.	I
3	The extrusion press has hydraulic leaks that require emptying the oil storage tank to repair. Hydraulic oil can be reused.	I
4	The electron beam melting furnace has 1964 electronic controls that include a transformer with PCBs. For continued operation, the power supply and controls should be replaced.	III

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Item #	Maintenance Item	Action
5	Additional ventilation will be added to the rolling mill, Erie forming press, extrusion press, and possible machine tools to better contain beryllium powder.	I

Table 2-7 Building 883 Production Equipment Maintenance Items

Item #	Maintenance Item	Action
1	The motor on the roll grinder needs replacement.	II
2	The hydraulic pumps on both A and B side HPM presses are leaking and need replacement. B side press requires electrical repair at on/off switch.	II
3	The end line preheat furnace on A side mill needs new heating elements and brick lining repair.	II
4	Reheat furnace on A side mill requires new thermocouples and heating element examination.	II
5	A side rolling mill requires preventive maintenance operations (PMO), including gas charging at accumulator.	II
6	Large die cart needs repair or replacement.	III

Table 2-8 Building 444/7 Production Equipment Maintenance Items

Item #	Maintenance Item	Action
1	Each of the eight vacuum induction melting furnaces require rebricking, because the brick has absorbed moisture during the three-year shutdown.	I
2	The vacuum system for the graphite shop is not working. The ducting needs modification at the beginning of Stage III, and the vacuum will be fixed after this modification.	II

2.8 Classified Parts/Tooling

At this time, there are classified parts and/or tooling present in Buildings 883 and 444. To allow for more ready access to these buildings for cleanup activities, these parts and tooling will be declassified. The best estimate of the quantity of tooling and parts is provided in Table 2-9.

Table 2-9 Estimated Quantities of Classified Parts/Tooling

Item	Building 883	Building 444
Stainless Steel Parts		70,000 lbs
Beryllium Parts	70,000 lbs	
Uranium Parts	20,000 lbs	18,000 lbs
Steel Tooling	85,000 lbs	5,000 lbs
Aluminum Tooling		4,000 lbs

The declassification of these materials is discussed in Section 3.0 of this document.

2.9 Physical Hazards

During the assessment of the NCPP buildings that was performed in Stage I, each of the buildings was evaluated for physical hazards. These are hazards that could affect the health and safety of the workers by exposure. Examples of physical hazards evaluated in the NCPP buildings were electrical hazards such as faulty equipment wiring, nonguarded equipment, cranes that have not been recently inspected, and improperly stored pressurized cylinders.

2.9.1 Building 865 Physical Hazard Assessment Results

The condition of the electrical systems in Building 865 has been recently assessed. The results of this inspection are contained in a report entitled "Building 865 Inspection Summary Report." According to this report and the conditions of the building as surveyed by CAS assessors, the electrical systems overall rating for the building is "good." Using the rating scale of the summary report, this means that the electrical system in the building is better than acceptable, but not excellent. In other words, work that needs to be performed does not have immediate safety-related implications. This work should, however, be performed when possible to add to the current safety rating of the building. The next inspection under the CAS program for the electrical system in the building is scheduled in September 1995.

The "Building 865 Inspection Summary Report" prepared by CAS assessors identified only one immediate physical hazard in the building. A metal ladder with a safety cage does not comply with OSHA standard, 29 CFR 1910.27. A work order was generated for its repair; however, the repair was suspended when Building 865 work was suspended. This repair should be reinstated and the ladder should be inspected to ensure that work to correct the noncompliant ladder has been performed. Additional safety hazards should be assessed at earliest convenience. Potential additional safety hazards identified in the buildings are enclosed spaces underneath presses and furnaces that may need to be accessed to determine chemical hazard levels in them.

2.9.2 Building 883 Physical Hazard Assessment Results

The electrical power systems of Building 883 are housed in the central high-bay area. High voltage systems for Rolling Mill A and Rolling Mill B and some of the associated electrical control systems are located there. This area also includes electrical systems and generators for heavy presses located in the adjacent high-bay Rooms 112 and 105. The status of these systems had been previously analyzed by CAS assessors. The CAS assessment rated the electrical system as "acceptable." On the CAS assessment scale, this is less desirable than "good" and more desirable than "poor." Of the maintenance items, the most apparent is that Building 883 has no lightning protection.

In Building 883, there are two Moffat heavy cranes that should be completely re-inspected and load tested before they are used to move any equipment during the NCPP. These cranes are located in high-bay areas housing Rolling Mill A and Rolling Mill B.

2.9.3 Building 444/7 Physical Hazard Assessment Results

The Building 444/7 electrical system should be re-inspected. The relative age of the building, coupled with the building history (a recent fire in a plating laboratory in 1990 traced to faulty wiring), make Building 444/7 an excellent candidate for additional electrical inspections and testing. A CAS assessment was not performed in this building by the M&O contractor because the program funding was not continued to complete its work, and as a result, this building was not assessed as the others in the NCPP. Some areas of the building need to have lighting replaced. Areas such as the toolgrinding area have historically been neglected for routine lighting fixture maintenance.

2.9.4 Physical Hazard Assessment Limitations

The main limitation to the physical hazard assessment was the fact that the CAS assessments that were performed for Buildings 865 and 883 were never performed for Building 444/7. It is, therefore, difficult to draw any conclusions and comparisons between the relative physical condition of the buildings. Consequently, during Stage II, more thorough investigations of the physical hazards are required.

3.0 Proposed Action

The Proposed Action will include the following activities:

- Additional characterization work to verify contamination levels, before, during, and after cleanup
- Cleanup activities necessary to satisfy Stage III and regulatory requirements
- Process verification work to determine those pieces of equipment to be retained for future use, and to verify the operating condition of equipment for future use
- Physical hazard resolution to ensure protection of human health and the environment
- Declassification work to allow ready access to the NCPP buildings

All Stage II work will be performed under the auspices of the NCPP Health and Safety Program and the NCPP Quality Assurance Program. The accomplishment of work under these controls will ensure the health and safety of the workers and the public, and will ensure that all work is reviewed and approved by proper levels of authority. By coordinating all work in this manner, interferences between NCPP work and other RFETS work will be minimized, and the Stage II work will not challenge the established building safety systems.

3.1 Sampling

Air samples are taken to determine whether airborne radiological hazards, beryllium or chemical hazards have the potential to impact the health and safety of workers involved in Stage II activities. This air sampling information, taken in the form of breathing zone air samples or air samples in the immediate area of work allows determination of whether additional engineered controls or personal protective equipment is necessary. Air sampling, both breathing zone and area, are discussed in Sections 3.2 and 5.1.

There are no surface contamination limits for the contaminants of concern; only air concentration limits. Therefore, the cleanup values for the NCPP are "air limits." However, measurement of surface contamination provides useful information about the presence and relative levels of contamination. During Stage II, surfaces and air in the NCPP buildings will be sampled. Each type of sample is performed for different reasons. Surfaces are sampled prior to cleaning to accurately determine the levels of surface contamination with respect to radionuclides, beryllium, other metals, and VOCs. Surfaces are also sampled after cleaning to verify the effectiveness of the cleanup. Surface sampling is discussed in greater detail in this section.

The current condition of the NCPP buildings is described in Section 2.0 of this document. In that section, limitations and deficiencies in the available data supplied by the M&O contractor were noted. To resolve those deficiencies and obtain a more accurate characterization of the NCPP buildings, Stage II will involve sampling work prior to the cleanup activities. This pre-cleanup sampling will be used to finalize selection of the cleanup technologies and methods to be used on each piece of equipment and in each area of the NCPP buildings. The pre-cleanup sampling will also indicate the extent of cleanup necessary and the protective measures necessary.

Throughout Stage II, sampling will be performed during the cleanup activities. This sampling will provide an ongoing measure of the contamination present in the area being cleaned. This information will allow cleanup personnel to determine the effectiveness of the cleaning method being used. It will also help determine when protective measures may be reduced, based on the reduced risk achieved as contamination is reduced.

After cleanup of the NCPP buildings, the level of cleanliness will be documented. Post-cleanup sampling will be performed after Stage II cleanup to obtain the data required to demonstrate the levels of cleanliness achieved. This data will also be used to establish an Environmental Baseline that defines the contamination levels at the end of Stage II. As Stage II nears completion, MSC will retain the services of an independent assessor to audit the management system/infrastructure that controlled the post-cleanup survey and perform independent sampling. This independent assessment will provide verification of the accuracy of the resulting data and will validate the post-cleanup survey results.

Both the pre- and post-cleanup sampling will be managed under the NCPP Sampling Plan. A brief discussion of the sampling that will take place during Stage II is presented below.

3.1.1 General Sampling Methodology

As stated in Section 2.0, Current Conditions, the primary COCs in the NCPP buildings are depleted uranium and beryllium. There are other possible COCs in each building, consisting of residues of substances used during past operations in the buildings. The sampling methodology to be used will check for the presence of radionuclides and beryllium, as these are the primary COCs. Sampling for other COCs will be focused on those with a reasonable probability of being present in an area. By limiting the sampling for other COCs in this way, the sampling will be managed in the most effective and efficient manner.

To sample for COCs prior to cleanup activities, random samples will be taken within the RCAs of the NCPP buildings where radionuclides, beryllium and other metals, volatile organic compounds (VOCs), and oils were handled. Broad banded analysis techniques will be used to determine the COCs present. The identified COCs will be used to target those COCs that are demonstrated to have a reasonable probability of being present in the NCPP buildings.

The method used to identify other COCs will consist of the following sequence:

1. Operational records of each NCPP building will be reviewed to determine the substances used in the past. This review will provide the sampling personnel with a list of suspected COCs.

2. Random surface samples will be taken within the RCAs to detect the presence of the suspected COCs.

3. Random air samples will be taken within the RCAs to detect the presence of the suspected COCs.

The number of random samples taken will be sufficient to provide a 95% confidence level in the results. Those COCs whose presence is not detected based on this sampling will be excluded from further sampling in that building/area.

The laboratories and analysis methods used will be appropriate for the particular contaminants being analyzed.

3.1.2 Sampling Approach

To provide a statistically sound sampling approach, a system of grids will be used for the final sampling of surfaces of building floors, walls, and ceilings. This system will enable the sampling personnel to systematically identify survey sample locations and will allow the sampling effort for these large areas to be focused on smaller units. These grids will be used for all sampling efforts, regardless of the contaminant for which the sample is being taken.

In this approach, the floor, wall, and ceiling surfaces of each room will be divided into a number of sampling cells. Each sampling cell will be 10 meters by 10 meters. Each sampling cell will be further divided into a reference grid. The distance between intersections in each reference grid will be 1 meter. This sampling method is based on NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination." This sampling method is also consistent with EPA/600/2-85/028, entitled "Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites."

For equipment, surface sampling will occur in much the same way. Equipment is much smaller than the floors, walls, and ceilings; therefore, the equipment is not divided into sampling cells. Each piece of equipment is its own entity for sampling purposes and can be described by name and serial number. The number of samples required on a piece of equipment is a function of the surface area and potential risk of contamination.

3.1.3 Beryllium Sampling

Before and after cleanup activities, beryllium sampling surveys will be performed. Surfaces will be surveyed to provide information that clarifies the level of contamination prior to initiation of cleaning activities. Provision of this data will allow the decontamination personnel to select the most appropriate cleanup method and technology. Surfaces to be sampled include equipment; supporting structures; electrical panels; piping; lighting fixtures; and ceiling, wall, and floor surfaces. Beryllium contamination characterization will include analysis via graphite furnace atomic absorption spectrophotometry. This analysis will be performed so that surface beryllium levels can be accurately determined. The methodology for beryllium sampling is described in detail in the NCPP Sampling Plan.

Other beryllium sampling surveys will be performed to support routine surface monitoring activities. Beryllium monitoring will be provided to individuals on a daily basis when they perform activities in beryllium-use areas or on equipment contaminated with beryllium. This sampling activity will be supported by NCPP management to ensure that workers are not exposed to beryllium from Stage II operations. All beryllium sampling will be managed under the auspices of the NCPP Health and Safety Program.

3.1.4 Radionuclide Sampling

Before and after cleanup activities, radionuclide sampling surveys will be performed. Surfaces will be surveyed to provide information that clarifies the level of contamination prior to initiating cleanup. Sampling will enable the decontamination personnel to select the most appropriate cleanup method and technology. Surfaces to be sampled include equipment; supporting structures; electrical panels; piping; lighting fixtures; and ceiling, wall, and floor surfaces. The radiological characterization will include isotopic analysis of samples taken in those areas where operational history indicates that enriched uranium was present (Building 883). This isotopic analysis will enable the sampling personnel to identify the isotope(s) comprising the contamination. If isotopic sampling reveals that isotopes other than uranium are present, the scope of the Sampling Plan, the Health and Safety Program, process verification activities (if directly involved), and allowed facility cleaning will be re-evaluated. Alternatives will include cleaning of other radionuclides found to be present or prohibiting additional project access to these areas where other radionuclide contamination is present until additional evaluations are performed. The following radiological measurements will be taken in these surveys:

- Surface radiation scans (fixed, non-removable) - one per square meter
- Surface radiation smears (smear surveys, removable using filter paper) - one per 2 square meters
- Subsurface radiation scans (fixed, non-removable) - taken after paint samples have been removed
- Subsurface radiation smears (smear surveys, removable using filter paper) - taken after paint samples have been removed
- Isotopic analysis of paint chips removed for sampling

Like the beryllium sampling, all radionuclide sampling activities will be managed under the auspices of the NCPP Health and Safety Program.

3.1.5 Other COCs

Based on historical operational data, the following organic solvents were used in the NCPP buildings in the past: methylene chloride, trichloroethane, freon, and tetrachloroethylene. Other solvents typically used in laboratories are also suspected to have been used in the NCPP buildings. As discussed in Section 3.1.1, at the beginning of Stage II, a program to identify the COCs with a reasonable probability of being present in each NCPP building will be implemented. When the list of suspected COCs is reduced to those with a reasonable probability of being present, the sampling to determine contamination levels will begin. The sampling approach for these COCs will be similar to that used for radionuclides. That is, samples will be taken before and after cleanup activities, the system of grids will be used to track and control the sampling effort, and the sampling will be performed under the auspices of the NCPP Health and Safety Program. If any other COCs are determined to be present, they will be cleaned to the values listed in Appendix B or to lower levels of contamination if possible under the ALARA program.

The following list of materials are those to which it is anticipated that NCPP employees may potentially be exposed during fiscal year 1995 activities. These are chemicals that may be used to clean, or perform analytical operations, or waste management operations.

Care has been taken during the selection of these materials to minimize the number of hazardous materials used to perform 1995 NCPP activities. As a result, many of the chosen cleaning materials and solvents do not have established Personal Exposure Limits (PELs). These same materials are not listed in the National Institute of Occupational Safety and Health (NIOSH) guide or American Conference of Governmental Industrial Hygienists Threshold Limit Values book.

Use of these materials; however, will be prudently managed to further minimize the potential for employee exposures.

Carbon Dioxide
Nitric Acid
Sulfuric Acid 70%
Orange Tough 40
Safe-Tee Chemical #NCPP Degreaser
Amway SA8 Phosphate Free Laundry soap powder
Gator Chemical #1001
Heavy Duty All Purpose Cleaner
Mariko - Detergent
D-Lead Liquid Detergent
Spartan Custom Car Wash
Spartan Pressure Wash Cleaner
Spartan Defoamer
Shine Line Multi-surface Cleaner
SD-20 All-purpose Cleaner
Spraylat SC 1071 Clear
Booth Strip
DTM Acrylic coating gloss & semi-gloss
ArmorSeal#5020 Floor Resurfacer/Aggregate
ArmorSeal #550 Self-leveling epoxy
ArmorSeal Flexible Joint Sealant
ArmorSeal Crack Sealant
Citristrip (paint stripper)
D-Limonene
Safe-TEE Chemical STC #113
1,1,1-trichloroethane
Atlas-Copco GA-8K compressor oil
Rampactor Conoco super hydraulic oil
Jaws of Life Monsanto Hydraulic oil
Armorseal Crack Sealant
Fiberglass Chopped Strand Mat. Gel Coat
Catalyst (Methyl Ethyl Ketone peroxide)
Polyester Resin DION ISO 6631T
Hydrosep (bacteriocide, fungicide, algecide)
Instapak - Component A
Froth-pak (duct fill foam)
Instapak - Component B
Instapak - Portcleaner
Instapak - Solvent

Quikrete (concrete mix)
Portland cement
Chemtrec CORPEX-935
Floor-dri
Oil Dri Pillows
Sherwin Williams-cleaning solvent
Pediner 54

3.1.6 Environmental Hazards

The systems that handle liquid waste from the NCPP buildings can be divided into three main categories: collection equipment (also known as ancillary equipment), holding tanks, and transfer lines. The transfer lines take liquid waste from the holding tanks and deliver it to Liquid Waste Operations in Building 374 for treatment. The transfer lines from the NCPP buildings meet the RCRA regulatory requirements.

The holding tanks receive liquid waste from the collection equipment, and hold it until it is transferred to Building 374. The M&O contractor currently has a program underway to perform RCRA clean closure on many of the tanks at RFETS, including the tanks associated with the NCPP buildings. Once the tanks have been closed under RCRA, they may be used to hold non-hazardous liquids. Since the NCPP will generate only non-hazardous liquid waste, the tanks associated with the NCPP buildings will be used after they have undergone RCRA clean closure.

As discussed in Section 2.4, some of the collection lines and equipment associated with the NCPP buildings do not currently meet RCRA regulatory requirements. The NCPP liquid effluents have been characterized as no-hazardous. As such, the collection lines and equipment can be used after they have been closed under RCRA. This RCRA closure will occur along with the tank closures. Until the closure is completed, temporary tanks will be used. The connecting lines between the tanks and the transfer lines will have administrative controls (e.g., daily inspections) in place. The collection lines and equipment that are not needed by the NCPP may be disconnected. The decision on whether or not to disconnect a particular line will be based on possible future use,, and on ease of access to the line.

During Stage II, an independent company or individual certified by the State of Colorado to perform asbestos activities will be retained to inspect the NCPP buildings and operations, identify deficiencies, and recommend actions. If asbestos is encountered during Stage II activities, a systematic protocol will be used. If the asbestos is friable or likely to be disturbed during Stage II or Stage III activities, a state-certified asbestos contractor will be retained to remove or immobilize the asbestos. All abatement will meet the requirements of Colorado Air Quality Control Commission Regulation #8, Part B. If the asbestos is immobile and in an area that will not be disturbed during Stage II or Stage III activities, the asbestos will be left in place. In either case, the work performed and the associated conditions will be documented. This work will be managed under the auspices of the NCPP Health and Safety Program, discussed in Section 3.6 of this document. Asbestos levels will be cleaned to the cleanup value levels listed in Appendix B or to lower levels if possible under the ALARA program.

3.1.7 Building Safety Systems

There is no sampling specifically planned by MSC relative to the building safety systems identified in Section 2.5, as this work falls under the Site Support Services Memorandum of Agreement. However, these hazards will be considered in the planning and performance of the Stage II cleanup activities.

3.2 Cleanup Activities

Section 3.2 discusses how cleanup work will be carried out during Stage II of the NCPP. The objectives (in order of priority) of Stage II cleanup activities in Buildings 865, 883, and 444/7 are:

1. To decontaminate and maintain identified equipment in Buildings 865, 883 and 444/7 for metal recycling operations in Stage III and to decontaminate and refurbish the building structure and internal areas suitable for those operations
2. To decontaminate and remove any remaining equipment suitable for use by DOE at Rocky Flats, by DOE anywhere else in the system, or assignment to universities or others through the DOE procedures for reassignment of equipment
3. To decontaminate and store any remaining equipment suitable for use in Stage III as NCPP feedstock
4. To decontaminate any suitable remaining equipment for disposal through government procedures
5. To prepare and dispose of or store as waste any remaining equipment not specified in any of the above categories

To be able to prepare cleanup plans the following assumptions during Stage I were made:

- For planning purposes, DOE has exercised the opportunity to retain equipment deemed necessary for continued mission support.
- Stage II dismantling and removal will take place on the basis of the projected plans and estimates for Stage III manufacturing.

  - DOE, as facility owners, retains first priority on any item for use either on or off plant site.
  - The Stage III contractor has the next priority on any remaining items for Stage III operations.
  - Any item having an appraised resale value in excess of the projected cost of decontamination will be considered for free release by DOE.
  - Any remaining iron-based items of suitable size that can be adequately decontaminated will be considered feedstock for Stage III recycling.
  - Any remaining material will be prepared and disposed of as waste, following decontamination as necessary to ensure that it meets low level waste acceptance criteria.

3.2.1 Cleanup Values

This pilot project is intended to demonstrate the feasibility of a commercial operation functioning on a DOE site. Accordingly, the proposed cleanup values for Stage II are consistent with those that commercial/industrial operations must meet pursuant to applicable Occupational Safety and Health Administration (OSHA), EPA, NRC, and state workplace regulations. The potential COCs have been identified by reviewing the historical release reports, operable unit work plans, field sampling plans, and other pertinent documents addressing past practices for the three NCPP buildings. Appendix B presents the proposed cleanup values for the individual COCs identified as relevant in the NCPP buildings, and Table 3-1 lists the cleanup values for depleted uranium and beryllium.

The values presented in Appendix B are taken from the regulations promulgated by OSHA and published as 29 Code of Federal Regulations (CFR) Part 1910. Commercial/industrial operations follow the OSHA regulations to maintain workplace conditions so that contaminant levels are less than the personal exposure limits (PELs) stated in the regulations. The PELs are composed of time weighted averages (TWAs), short-term exposure limits (STELs), ceiling concentration limits, and maximum peak concentration limits. STELs, ceiling concentration limits, and maximum peak concentration limits are not promulgated for all substances.

For some substances, action levels are included in the regulations. If ambient conditions in the workplace are such that the workers may be exposed to contaminant levels higher than the action level, then the operator must provide protective systems for the worker. Engineering controls such as containment structures or isolation of the contaminant source are examples of protective systems. Personal protective equipment such as coveralls, gloves, masks, and respirators are other examples of protective systems. For other substances, action levels are voluntary but are useful to provide better management of potential employee hazardous materials exposure. Action levels are the foundation of an ALARA program.

The NCPP will operate in full compliance with the OSHA regulations, maintaining workplace conditions in a state such that a worker is not exposed to substances in concentrations and forms in excess of the promulgated PELs. The workplace will be monitored for all identified COCs. In cases where the ambient concentration of a substance in the workplace is found to exceed the action level for that substance, the operator will undertake an evaluation to establish if it is safe to temporarily operate at levels exceeding the action level for the substance. Substances will be controlled in these areas by employing engineered controls, personal protective equipment, and administrative systems as appropriate to ensure that employees who work in an area where the action limit is exceeded are protected.

Two contaminants, beryllium and depleted uranium, are of particular concern, because they are known to be present as a result of past operations. For beryllium, the following OSHA-promulgated values for workplace air contamination are used:

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Level	Concentration (in micrograms per cubic meter)
Time weighted average	2
Ceiling concentration limit	5
Maximum peak concentration limit	25 (with a time limit of 30 minutes total)

For surface beryllium contamination, there is a current plant housekeeping standard, not codified and thus not enforceable, of 25 micrograms per square foot.

For depleted uranium, the situation is more complex, as PELs in air have been promulgated for very soluble, soluble, and insoluble compounds. These different limits are in force because of the effect of inhaling uranium particles followed by dissolution resulting in metal toxicity. Also, there are limits for different isotopes because of their differing effects on the lungs. Permissible surface contamination levels and emission rates are also established for fixed and removable depleted uranium contamination. Appendix B contains specific values.

For the NCPP, an ALARA program will be established with the goal of operating at contaminant levels lower than the levels permitted by OSHA or, in the case of radiation, established by NRC regulation and DOE order. Under this program, if MSC determines that it is reasonable and feasible to achieve cleanliness levels more stringent than those required by regulation, actions necessary to achieve these levels will be performed. MSC will attempt, under its ALARA program, to clean beryllium contamination to one-tenth the current plant housekeeping standard for surface contamination, and one-tenth the PEL for airborne beryllium. A similar approach will be taken for depleted uranium, with the ALARA goals being one-tenth the value for surface contamination levels and one-tenth the permissible level for emissions for airborne contamination levels. To summarize, the NCPP buildings will be cleaned to meet the cleanup values. The NCPP will clean further in those areas where it is economically feasible. This further cleaning will attempt to achieve the ALARA target values.

Equipment and buildings comprising the NCPP will be decontaminated as part of Stage II operations. Equipment will be cleaned to contamination levels appropriate to whether the equipment is to be used by a private operator in Stage III, used by DOE elsewhere, retained for use as feedstock in Stage III, made available for transfer off site, or disposed of as waste. A cleanup value has been identified for each of the above options. These cleanup values represent the minimum cleanup values acceptable and lower contamination levels will be attained wherever financially practicable to meet ALARA programmatic goals. As part of the NCPP ALARA program, MSC will explore the following options to determine the reasonability for cleaning to levels lower than allowable levels: 1) engineered controls, 2) administrative controls, 3) personal protective equipment, and 4) economic feasibility.

Cleanup values for beryllium and depleted uranium appropriate for use during Stage II of the NCPP are listed in Table 3-1. Decontamination work in Stage II must achieve the minimum values in Table 3-1 for operations in Stage III to commence. These values will be achieved and exceeded wherever possible and practical.

The current levels of contamination in the NCPP buildings have been determined as accurately as possible, based on existing data from the M&O contractor. A summary of this information is presented in Section 2.0 of this document. Before cleanup operations begin, additional building characterization will take place. A program of sampling is being drafted to complete the building characterization. The sampling program and the characterization work plan are discussed in Section 3.1 of this document.

Table 3-1 Beryllium and Depleted Uranium Cleanup Values Applicable to Stage II

		Uranium α and β/γ[(a), (b), (c)]			
	Beryllium $\mu g/100\ cm^2$	α Removable ($dpm/100\ cm^2$)	α Total (Fixed and Removable) ($dpm/100\ cm^2$)	β/γ Removable ($dpm/100\ cm^2$)	β/γ Total (Fixed and Removable) ($dpm/100\ cm^2$)
Stage III operations	2.7	1,000	5,000	1,000	5,000
Transfer to other radiation control areas on plant site	2.7	1,000	5,000	1,000	5,000
Transfer to other DOE facilities	2.7	1,000	5,000	1,000	5,000
Decontamination for use as Stage III feedstock [(d)]	2.7	1.11×10^6	1.11×10^6	1.11×10^6	1.11×10^6
Release for unrestricted use off site	2.7	1,000	5,000	1,000	5,000
Disposal as waste if not in the above categories	Refer to RFETS waste management requirements	Refer to RFETS waste management requirements	Refer to RFETS waste management requirements	Refer to RFETS waste management requirements	Refer to RFETS waste management requirements

[(a)] These values were obtained from the Health and safety Practices Manual, EG&G Rocky Flats, Inc. Procedure No. HSP-18.10, Table I Radioactive Surface Contamination Limits for Unrestricted Release and Table II Radiological Surface Contamination Limit for Conditional Release/Transfer, Revision 0, November 1992.

[(b)] These values are consistent with those found in DOE/EH-0256T, US DOE Radiological Control Manual, Revision 1, April 1994.

[(c)] These values are consistent with values practiced by the NRC in Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors, June 1974.

[(d)] These values have been derived from calculations concerning the maximum allowable curie content of a waste product container in Stage III of 2 nCi/g. Based upon a container weight of approximately 1166 lbs and considering an average feedstock item size of 12" x 6" x 6", a value of $1.11 \times 10^6\ dpm/100\ cm^2$ maximum allowable surface contamination for feedstock has been calculated. This is an initial estimate of the allowable contamination for feedstock and prior to recycle operations beginning, this figure will be revised in light of the information available at that time. In practical terms, this limitation on surface contamination is exceedingly unlikely ever to be approached, as (1) current knowledge of the facility condition indicates no surface contamination levels anywhere near this figure and, (2) the ALARA principle will be applied during Stage II operations ensuring contamination levels are maintained at a low level and reduced wherever reasonably achievable.

3.2.2 The 10-Step Building Decontamination Process

A generic cleanup plan for the buildings that comprise the NCPP has been created. In general terms, the following principles comprise the cleanup plan:

- Remove waste, reduce contamination levels, and construct decontamination facilities
- Clean and remove equipment not required in Stage III
- Clean and maintain equipment required during Stage III
- Conduct building restoration and cleanup

The proposed, broad sequence of the generic cleanup plan for the buildings is presented below and is shown for planning purposes only. The plan shows a sequence of operations progressing from one step to another; however, operational constraints may require concurrent activities some steps. Additionally, some steps may be reorganized if unforeseen circumstances arise. Any appreciable changes outside the scope of the IM/IRA will be reviewed on a case-by-case basis with the regulators to determine whether formal public review is required. The public will be able to obtain information concerning ongoing activities through the public outreach program described in Section 6.0.

The cleanup plan follows these principles and has been divided into a 10-step process for each building. Table 3-2 identifies these ten steps, and Appendix C provides the Decision Trees associated with each step, including how contaminated items will be dealt with.

Table 3-2 The 10 Step Cleanup Process to be Used in Stage II

Step 1	Removal of loose waste/unwanted equipment
Step 2	Cleaning of high-contamination areas
Step 3	Assembly of a decontamination module
Step 4	Removal and decontamination of low-contamination items of equipment
Step 5	Removal and decontamination of high-contaminated items of equipment
Step 6	Decontamination, dismantling, and removal of services no longer required
Step 7	Repairs to structure following removal of equipment
Step 8	Dismantling, cleaning, and reassembling retained equipment considered as low-contamination risk
Step 9	Dismantling, cleaning, and reassembling retained equipment considered as high-contamination risk
Step 10	Final decontamination of complete building to operational levels

These steps are further described as follows:

Step 1: Removal of Loose Waste/Unwanted Equipment

Current understanding of the condition of each building is that most small, loose items are either waste or tools and unlikely to be contaminated above action levels for either radioactive materials or beryllium. Step 1 of the cleanup plan involves the collection and packaging of waste/unwanted equipment to make room for future operations, avoid (re)contamination of relatively clean materials during future operations, demonstrate good housekeeping practices, and allow workers to begin processing waste in accordance with MSC procedures. A significant quantity of unwanted tools, benches, cabinets, etc., must be removed either for disposal or reuse. Only lightly contaminated items are to be considered in this step. Significantly contaminated items will be treated in later steps. In Step 1 all waste is to be removed from the building, because available space in each building is to be set aside for storage of scrap to be recycled in Stage III. Particular areas to clean include rooms designated as future waste handling/decontamination/dispatch areas.

Step 2: Cleaning of High-Contamination Areas

The Stage I characterization results indicate that areas of high contamination remain in the building. These areas will be cleaned in Step 2 to (1) reduce the potential for resuspension during future operations with subsequent health implications, (2) reduce clothing and respiratory requirements for upcoming work to as little as practically achievable, (3) and demonstrate good housekeeping. Knowledge of previous operations in each building points to areas of potential contamination, including the channels/sumps beneath presses, the beryllium electro-refining cell, the beryllium glovebox, and certain machines used for machining/other metal operations. The sumps will be considered at this stage for clean out, as will some machines known to be contaminated. The beryllium glovebox is going to be transferred to Los Alamos National Laboratory (LANL) under the Beryllium Technology and Pit Support Functions. This transfer has bee approved by both LANL and RFETS, and is scheduled to be carried out by February 1995. This transfer is not part of the Proposed Action; however, it is mentioned here for completeness.

Areas requiring decontamination at this stage are probably small. The cleanup technique, therefore, may be localized washing. The use of temporary containments will be considered at the time of cleaning. Such a containment could simply consist of a polyvinyl chloride (PVC) tent or modular containment with a localized exhaust allowing operators to clean an area without risk of spreading the contamination. The clothing and respiratory requirements for this work will be determined at the time based on consultation with a contamination control technician (CCT). Step 2 will be complete when there are no areas of any of the NCPP buildings with action levels of contamination capable of being resuspended, causing a radiological or toxicological hazard. Necessary repairs to floors or other surfaces after this decontamination step (e.g., if floor scabbling has taken place) will be performed in Step 2, if required, or deferred to Step 7.

Step 3: Assembly of a Decontamination Module

Prior to unwanted equipment being removed for reuse, recycle, or disposal, some degree of decontamination is expected to be necessary. Even if externally clean, dismantling and internal monitoring will be required, particularly for any equipment intended for free release (resale or disposal). Step 3 involves the assembly of a centralized decontamination module in each

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building to process equipment leaving each building. Instead of opening up equipment *in-situ* and risking release of contamination, equipment is to be transferred (as intact as possible) to the centralized module where it can be dismantled under controlled conditions before transfer to interim storage or movement from the building. If some dismantling is necessary prior to transfer to the centralized module, each case will be assessed and localized containment provided as necessary. The module will be simple in design, easy to assemble, and semi-permanent. After its role in decontaminating equipment during Stage II, it can be retained if required for any future decontamination operations requiring containment during Stage III. The centralized module shall be ventilated with controlled access and capable of receiving and dispatching large items of equipment. The internal surfaces of the module must be constructed from appropriate materials to allow application of strippable/tie-down coatings and subsequent decontamination. The centralized decontamination module will remain operational throughout Stage II and only be removed when the Stage III operator considers that there is no further use of the structure.

Step 4: Removal and Decontamination of Low-Contamination Items of Equipment

Items of equipment not required for future operations will be removed in Step 4. In this section of the work, priority will be given to items of low contamination (which have been identified for removal) that do not require the use of containment for cleaning and dismantling. The risk of uncovering contamination of a significant nature will exist and, should this occur, steps to contain the contamination (beryllium or radiological) will be taken. Prior to any dismantling and/or removal, each item of equipment will be permanently disconnected from any services supplied to that item, including electrical, water, air, reagent, and steam supplies. Ventilation ducts will remain in place until the latest time possible to allow the continued ventilation (and hence assist in containing contamination) of the equipment. After Step 1, these items will be identified and monitored *in-situ* before dismantling. Typical equipment to be handled in Step 4 includes items that have rarely or never handled uranium or beryllium materials. These items will be disconnected from ancillary equipment, services, supports, or other attachments and dismantled *in-situ*. Any contamination found on the equipment will be removed in this step. Should any persistent contamination be found, the equipment will be wrapped and transferred to the decontamination module for more thorough decontamination. When the item has achieved a value of cleanliness at or approaching the appropriate criteria, it will be transferred to a suitable location for detailed monitoring prior to disposal or interim storage for the following reasons:

- This category includes a significant amount of equipment in the buildings, particularly Building 865. Removal will significantly improve access to other equipment.

- Low-contamination risk items are easier to handle because they should not require containment for dismantling. Although the risk of uncovering contamination of significance remains, by analysis of previous operations, this risk should largely be predictable. The option to add containment remains open during this step.

Areas will be available in each building suitable for interim storage of cleaned materials from this step. Items awaiting processing will almost certainly need to be wrapped to avoid cross contamination.

Step 5: Removal and Decontamination of High-Contaminated Items of Equipment

With unwanted low-contamination risk equipment removed from the working areas, work can commence to dismantle and remove the unwanted equipment that has known or potentially significant contamination content. It is assumed at this stage that ventilated localized containments will be necessary for work in Step 5. Current plans indicate that a number of localized containments will be necessary to process this category of equipment. Localized containments will be semi-permanent and fabricated from a material capable of construction into an enclosure in modular form and of decontamination following use. As the use of localized containments significantly adds to the time taken to remove this category of equipment, any practical steps possible to prevent the inclusion of equipment into this category should be considered.

The general principle of operation in this step is to construct a containment around a significantly sized item of equipment. After preparation of the containment, the equipment will be dismantled and gross contamination will be removed. The workers will dismantle as much of the equipment as necessary to move it to the decontamination module for final decontamination. This dismantling technique will allow reassembly outside of the containment for equipment to be reused or more aggressive techniques (plasma arc cutting, cutting with saws, compacting) if the item is for disposal or recycle. When complete, each item will be transferred to the decontamination module. The containment will be cleaned (by application of tie-down coatings or standard decontamination techniques) and the next identified item brought into it. The module will then be resealed and the operation repeated. Each containment will be ventilated with worker access provided.

This sequence will proceed logically as determined by accessibility, radiological and toxicological potential, and other requirements as set by external parties (e.g., if a customer is found for an item, it may be necessary to decontaminate and remove it from the building out of sequence).

Step 6: Decontamination, Dismantling, and Removal of Services No Longer Required

When all unwanted equipment is out of the building, services to those items will be removed as considered practical. Ventilation ducts will be cut and capped and sectioned for transfer to the decontamination module. In the case of ventilation ductwork, techniques for fixing any contamination onto the internal and external surfaces of the ductwork will be considered prior to cutting. This option should remove the need for localized containment during cutting; however, the implications of the fixing will be considered in relation to the final destination of the ductwork. A judgment will be made at that time on the basis of measured loose contamination in the duct. Service supply lines will be cut back as far as possible. Electrical connections will be removed back to junction boxes/disconnects.

Step 7: Repairs to Structure Following Removal of Equipment

When all unwanted equipment is removed (or after each item is removed) repairs to floor, walls, or ceiling will be made. This work may consist of filling bolt securing holes in the floor or filling in channels/sumps. This is unlikely to be a major work package, but it is considered important as this action will help in reducing areas for future contamination to accumulate.

Step 8: Dismantling, Cleaning and Reassembling Retained Equipment Considered as Low-Contamination Risk

Equipment to be retained as operational or stand-by in each building has been assessed whether or not it has known or potential internal contamination. Step 8 involves the cleaning of those items of equipment required for future building operations that are considered to be low risk in terms of beryllium or radiological contamination. Equipment in this category will be decontaminated as far as practicable with the opportunity taken at this time for any necessary maintenance for the item prior to Stage III operations commencing. This step, therefore, amounts to disassembly, decontamination, maintenance, and reassembly/testing. As in Step 6, if unexpected contamination is detected, work will cease and containment erected around the equipment to allow work to proceed without risk of contamination spread to surrounding cleaner areas. Step 8 can proceed concurrently with Step 9 as all equipment at this stage will remain in the building.

Step 9: Dismantling, Cleaning, and Reassembling Retained Equipment Considered as High-Contamination Risk

Step 9 involves the work necessary to clean and maintain equipment required for Stage III operations but which is considered to have known or potential contamination to a significant degree. Similarly to Step 7, equipment will be contained, dismantled, and decontaminated in a controlled environment, minimizing the potential spread of any contamination. Localized containment will be constructed around a significant item of equipment and it will be dismantled and decontaminated inside the containment. When cleaned, the item will be maintained ready for Stage III operations. This operation could take place inside the containment or, preferably, after it has been removed, as this eases access and improves working conditions. In the case of smaller items of equipment (for example, lathes) a centralized containment will be built and prepared with equipment brought into the containment as necessary. When cleaned, the opportunity will be taken to reposition equipment as considered appropriate. This step of the work is likely to be relatively lengthy as a result of the need to construct and prepare the containment followed by decontamination and dismantling when work is complete. As in Step 5, any practicable action that will allow dismantling, cleaning, and maintenance of equipment without the need for a containment should be considered. The decision on whether or not to use containment will be based on the contamination levels, and the potential for contamination spread.

Step 10: Final Decontamination of Complete Building to Operational Levels

When all the above Steps are completed, final decontamination of the building and equipment will occur. Throughout Stage II operations, regular surveys of the building at agreed reference points will take place. Any elevated contamination levels will be detected and decontaminated with the source of the increase identified and stopped. The final decontamination in Stage II will attempt to achieve agreed contamination levels for radiological materials and beryllium for continued operations in the building. The sequence of operations will progress logically and will include all surfaces. This step may take some time as it will involve ceilings, walls, floors, and equipment decontamination to low levels. The deliverable at the end of Step 10 will be a fully characterized building that meets ALARA programmatic goals, and it is expected to be well below the limit required for the operations expected in Stage III. Tools used during the building decontamination process will also be decontaminated as necessary during this step.

Note: Please see Section 3.1 for the discussion of post-cleanup sampling

3.2.3 Integration of Cleanup Values with Stage I Characterization Results Creating a Decision Tree for Cleanup Activities

One of the major unknowns included in the planning of Stage II operations during Stage I is that there are areas in all buildings that have not been completely surveyed for radiological or toxicological contamination. Examples of such areas are inside items of equipment, beneath equipment, in inaccessible areas due to height, in the bottoms of sumps, etc. Furthermore, total decontamination may, in some cases, prove to be prohibitively expensive to achieve or impractical considering the projected use of the equipment. As such, to explore the options open during Stage II of the NCPP, it is considered necessary to create decision trees to guide decontamination work teams through the options available during the cleanup stage of the project. Despite the absence of full contamination information, analysis of operational history has indicated areas where high contamination is either known to exist or where it is likely to be present. The durations allowed for dismantling and decontamination in the cleanup plan allow for these expected contamination levels.

Section 3.2.2 describes the cleanup values applicable for the various streams of equipment coming from Stage II of the project. It is the intention of the project to meet these criteria as a minimum and to exceed them (i.e., clean further) wherever practicably and financially feasible to meet ALARA programmatic goals.

The decision trees center on the decontamination necessary to achieve the appropriate cleanup values (i.e., for use in Stage III operations, reuse elsewhere within the DOE, recycle, free release, and categorization as low level waste or low level mixed waste). These decision trees are based

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upon decontamination operations occurring in Steps 1 through 10 as detailed earlier in this document and appear in Appendix C.

The decision trees show how the need to comply with the various acceptance criteria for contamination affects the degree of contamination tolerable for an item of equipment. Furthermore, the decision trees show how the economics of continued or extensive decontamination, the value of the item being decontaminated, and the risk of using aggressive decontamination methods rendering the item unusable contribute to the decision making process taking place in Stage II. In each decision tree where materials are released from the buildings, a series of decision points is included to help ascertain the route that equipment will take out of the building. These decision trees will be used in Stage II as guides to finalize work plans and schedules for equipment removal/maintenance. In these decision trees, the reference to decontamination methods to be used is purposefully left as unspecified. This subject is covered in Section 3.2.4.

3.2.4 Identification of Available Cleanup Technologies

Several established decontamination techniques have been identified for possible use during the cleanup operations in Stage II. At this time, it is not possible to be 100% definitive about which will be used when, as there are a number of unknowns still present relating to contaminants, including the following:

- the degree of contamination remains unknown on the items to be cleaned
- the nature of the contamination and its adherence to the item to be cleaned
- the effectiveness of each decontamination method for the different types of item to be cleaned.

Table 3-3 presents a list of the decontamination methods to be used. As explained later, not every method is suitable for each step of the process. This list is provided for completeness only at this point.

Emission of particulates generated during cleanup activities will be controlled using HEPA filters. The use of VOCs during cleanup will be minimized. In the event that VOCs are used, if the VOC is a non-criteria reportable pollutant under Regulation #3, and the quantity used is above the *de minimis* quantity defined under Regulation #3, charcoal filters will be used to control the emissions.

Table 3-3 Decontamination Techniques Proposed for the NCPP Buildings

Method	Proposed Area of Use
Wiping/Washing/Scrubbing	metal surfaces, walls, floors
Vacuuming	surfaces, floors
Paint Stripper	painted surfaces
CO_2 Blasting	all surfaces, inside containment

Method	Proposed Area of Use
High-Pressure Water/Steam Cleaning	walls, ceilings, floors
Foam Decontaminants	walls, ceilings, metallic components
Grit Blasting	small, metallic components
Grinding/Scabbling	concrete floors
Chemical Decontamination	concrete floors
Electropolishing	small metallic components (except stainless steel)
Strippable Coatings	modular containments, other areas as required
Ultrasonic Cleaning	small components

The following items are not decontamination methods in themselves but are included as aids to decontamination.

Aid	Proposed Area of Use
Modular Containments/PVC Tenting	significantly contaminated equipment dismantling
Exit Showers/Water Cleanup Systems	washing suited operators after work inside contaminated containments and subsequent cleaning of water effluent
Foam Filling	pipework/ductwork contamination fixation

Details of why each of the above methods has been included are given in the Facility Cleanup Plan (ref.). Not every method listed above will be used in each step of the process. The applicability of each method is discussed in Section 3.2.5.

3.2.5 Decontamination Logic Diagram

In the decision trees for the 10-step process, the description of the decontamination method was left unspecified. The decontamination method was unspecified to simplify the diagram, as there are a number of decontamination technologies that can be applied to each step of the process.

Figure 3-1 represents the logic that is applied to the selection of the appropriate cleanup technique for each step (or item within a step if they are of varied contamination level, construction, or covering). Figure 3-1 shows the process to be in four basic phases.

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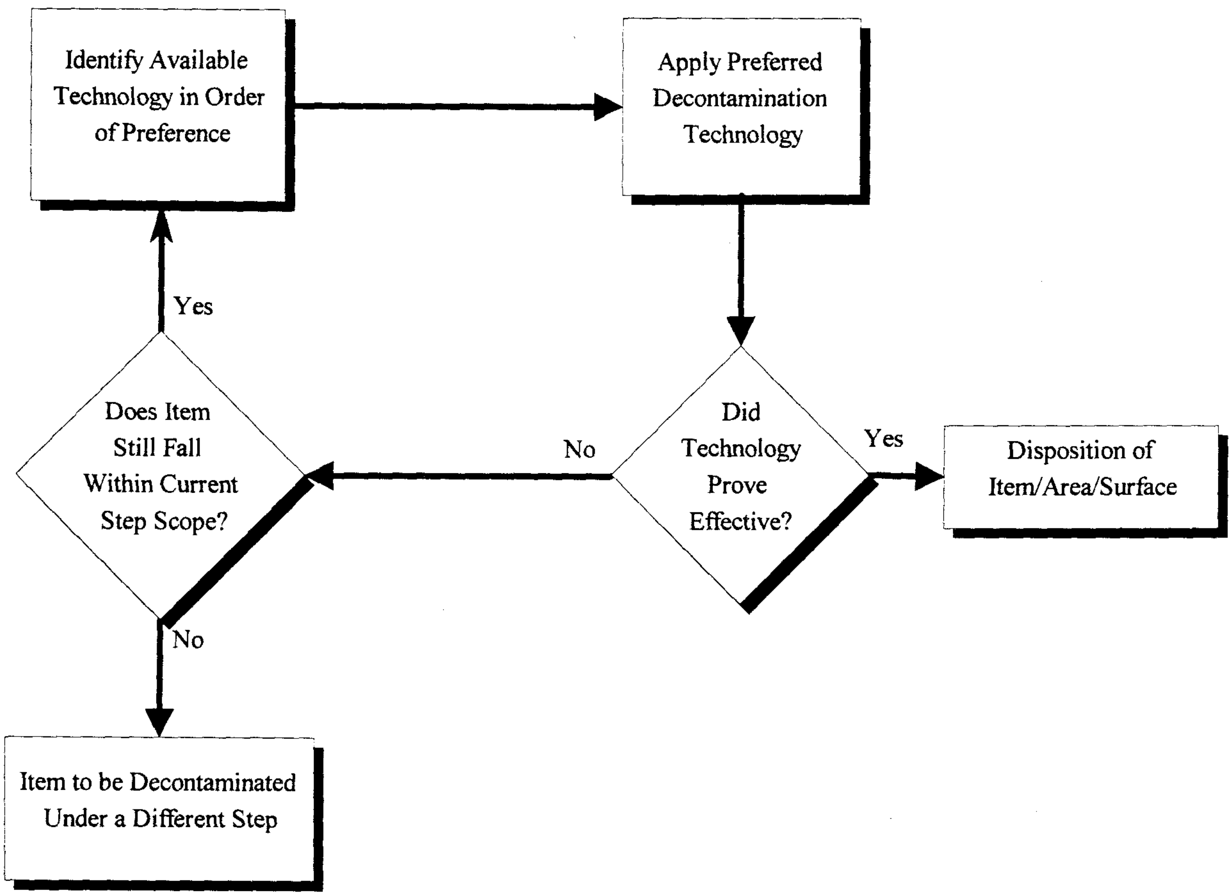
Figure 3-1

Decontamination Logic Diagram



Phase I From existing knowledge of the items to be cleaned within a cleanup step, a number of decontamination methods can be identified as being (or probably being) applicable and effective in decontaminating the item (by this stage, all the methods available will have been deemed appropriate for use in the project, particularly in reference to effluent compatibility with downstream processes). From a list of available methods, an order of application can be established. This order or preference will be based upon using the simplest (and least expensive) method first, then building up to sophisticated (and expensive) methods if all else fails. At this stage of project planning, it is not possible to say, categorically, what will and what will not be the method of decontamination. What can be determined is the order of application of decontamination methods. At the start of the cleanup process, all methods will be tried in order of preference to achieve the required cleanup value.

As experience is gained in cleanup techniques, some methods of decontamination of a particular item may be dropped from the applicability list if they are shown to be ineffective in achieving the required cleanup value.

Phase II Phase II examines the application of a chosen decontamination method on an item or surface. Applications may be repeated or single action but in this representation, it is the same method that is being applied.

Phase III This phase concerns the evaluation of the effectiveness of the chosen decontamination technique. Depending upon how the contamination is believed to be attached to the item, this may be visually apparent (e.g., if contamination is held within a painted surface, and that painted surface has been removed using a chemical paint stripper, the progress of the decontamination will readily be apparent). True progress, however, will require evaluation via contamination samples taken from the item being cleaned. The evaluation of the smears may, in the case of radiological contamination, be readily made by a team worker with an instrument for measuring radioactivity. Measurement of other contaminants (e.g., beryllium) will require a more sophisticated measurement technique. As these types of measurements may take a significant period of time, it may be the case that such samples are only taken when the end result is believed to have been achieved. If the evaluation of effectiveness shows that the cleanup method is achieving results that are likely, by itself, to achieve the required cleanup value, then re-application of that decontamination method will continue. If the method is shown to be ineffective, then a more aggressive/effective method will be selected.

Phase IV Phase IV allows for a re-evaluation of the ongoing decontamination process. Decontamination methods may be non-destructive or destructive. For example, washing is non-destructive, as an item can be washed indefinitely without it being harmed (exceptions to the basic rules can always be found). Grit blasting or scabbling, on the other hand, are destructive methods, as they both remove a surface layer from the item or area being cleaned. This phase allows for a re-evaluation of the proposed decontamination plan for an item or area. If a piece of equipment is being prepared for reuse in another location and fixed contamination remains at a level above that which is acceptable for reuse, then it is possible that, without destroying or damaging the item (and rendering it unusable), the item may never be suitable for reuse. If this is the case, then the item will be considered for recycle or disposal as waste. The effect of destructive decontamination on each item being cleaned for reuse will be assessed before application takes place. An example of this type of decision making process could be a precision item required for the operation of machinery to be used off site. If decontamination is required and the only effective method would render the piece unusable, then a decision will be made at that time on whether to continue with the decontamination process or whether to discard that item into the recycle or waste routes. A further example concerns engrained contamination in a concrete structural support member. Because grinding to remove the contamination may weaken the member, it may be preferable to leave the contamination in place and to protect workers and the environment from any residual hazard by fixing the contamination in place. In instances such as these, technical assistance from the appropriate person (e.g., structural engineer, health and safety manager) will be sought before proceeding with isolation or removal.

3.2.6 Decontamination Technique/Application Matrix

Appendix D is a Decontamination Technique/Application Matrix that shows the order of preference in using suitable decontamination methods at each step of the cleanup process. The matrix is generic for each step, although it is anticipated that the identified suitable techniques will, in use, allow the required cleanup value to be achieved. It may be possible, however, that a technique previously considered unsuitable may achieve cleanup in the case of particularly stubborn contamination. This table is not intended to state the only methods to be used for cleanup at each step but to indicate the preferred order of use of each method. The table does not preclude the use of any approved technique identified at any step of the cleanup process.

By examining the Decontamination Technique/Application Matrix in conjunction with the Decontamination Logic Diagram, it is possible to establish the process of decontamination method selection and the order in which these methods will be applied.

3.3 Process Verification/Additional Equipment Assessment

During Stage II, it will be necessary to identify and verify some processes for production and to test the equipment in these processes. The selection of processes to be verified is influenced by the need to test the operating condition of the equipment under load and to establish fabrication procedures for potential products. This will be done, for the most part, by prototype production of waste containers. All process verification and equipment activities will be coordinated with the cleanup activities to avoid recontamination of areas or equipment that have been decontaminated, and will meet all applicable regulations. The following sections describe the process verification activities in Stage II.

3.3.1 Waste Container Prototypes

Fabrication of forty one-hundred cubic foot (3 by 4 by 8 foot) waste boxes from radioactively contaminated steel will test the reheat capacity for rolling, establish rolling procedures, create the forming sequence, and test the welding equipment. Participation in waste container prototype fabrication will also answer questions about leveling and cleaning the rolled steel.

The prototype fabrication will also involve producing between 50 and 200 coffee-can-size containers. Fabricating a part of these needs from recycled stainless steel will test the forming press, including the Hydrospin capability, and establish the process.

3.3.2 Beryllium-Aluminum Casting Verification

Another process verification activity to be performed during Stage II involves using the electron beam (EB) melting furnace to produce a beryllium-aluminum alloy. This is necessary to verify that the rapid solidification of the alloy improves the grain structure. The EB melting furnace maximum size ingot is 6 inches in diameter, which is too small for commercial products. However, the vacuum arc remelter (VAR) furnace located in Building 447 can cast 10-inch-diameter ingots, which matches commercial needs. The concept is to verify the process with the EB furnace before using the $3 million VAR furnace.

3.3.3 Beryllium-Copper Bonding Verification

A potential market requires tiles of beryllium bonded to copper plate. By producing two 11-inch squares, several pieces of equipment within Building 865 can be tested under fabrication load. A preheating furnace and rolling mill are required to produce the plate. Trials to determine the bonding parameters require the operation of the brew vacuum hot press. Plate and bonding container preparation will test milling and lathe machines. Vacuum anneals of the plate require the ABAR vacuum furnace, and the final bonding will develop the operating procedure for the hot isostatic press (HIP).

The process verification activities test the conditions of most of the major pieces of equipment that will be retained for privatization. There are some pieces of equipment, however, that will not be tested by the process verification activities. To verify the operable condition of these other pieces of equipment, the following dry run operations will be performed:

- Machining equipment (mills, lathes, grinders, etc.) will have all movement functions tested.
- Metallurgical laboratory equipment (metallographs, hardness testers, tensile testing machine, grinder/polisher) will be tested to verify the applicable functions such as light source, calibration, movement speeds, and waste water collection.
- Annealing furnaces will be operated at 800 $^{\circ}$C to check temperature control.
- The extrusion press will be operated to verify proper ram movement and hydraulic system integrity.
- The cold isostatic press will be tested to verify proper valve and limit switch operation.
- The hydroform press will be tested to verify proper operation.

The results of this additional equipment assessment will be recorded to create a file on all major pieces of equipment. The file will include the manufacturer's operating and maintenance manuals, the PMO procedures, safety analysis for operation, and operating procedures or instructions. This activity also includes the revision of building drawings based on utility modifications made during Stage II.

3.4 Maintenance of Building Infrastructure and Equipment

The infrastructure and equipment related to the NCPP buildings' safety systems will be maintained by the M&O contractor, under the auspices of the Site Support Services Memorandum of Agreement. During Stage II, MSC will coordinate with the M&O contractor to ensure that the Stage II activities do not challenge these safety systems.

3.5 Physical Hazard Resolution

All of the NCPP buildings will receive certified electrical and power distribution inspections. This will be accomplished by contracting certified inspectors to conduct the surveys and identify deficiencies. Deficiencies will be corrected either by MSC or by the M&O contractor through the Site Support Services Memorandum of Agreement, depending on the nature of the deficiency.

Additionally, the "Moffat" heavy cranes located in Building 883 will be inspected and load tested by certified inspectors under contract to MSC.

In Building 447, lighting levels appear to be below specified limits, as a result of decreased maintenance. In Stage II, lighting levels will be further assessed and measured to determine the extent of the deficiency, after which lighting levels will be returned to specified limits.

Varying quantities of residual chemicals were identified in each of the buildings. Most of these chemicals have been identified and cataloged in the building's chemical inventory. As explained in the earlier sections of this IM/IRA Decision Document, the residual chemicals will be removed by the M&O contractor prior to cleanup operations.

Chemicals to be utilized for the cleanup activities will be handled and used under the controlled procedures of the Health and Safety Plan to be developed early in Stage II. Material safety data sheets (MSDSs) for all chemicals will be retained in the building under the auspices of the Health and Safety Plan and the Quality Assurance Program Plan.

The status of these resolutions will be reported in the monthly update to the Steering Committee (see Section 3.9).

3.6 Declassification Activities

The quantities and materials of the items that will require declassification are presented in Section 2.9 of this document. The declassification of these items involves melting and/or size reducing (crushing) the items to ensure that their classified properties (shapes, numbers, etc.) are no longer discernible. In this section, a brief discussion of the declassification activities is presented.

3.6.1 Stainless Steel Items

The stainless steel and steel tooling will be melted in the VIM furnace. To melt the stainless steel and steel tooling, the VIM furnace will require rebricking, induction coil modification, and installation of a ceramic crucible.

3.6.2 Beryllium Items

Many of the beryllium parts will require the removal of a coating, followed by crushing, to reduce the size of the part. The coat stripping is performed in an alkaline bath, which will require installation of two 2 by 3 by 4 foot baths, one for the alkaline liquid and the other for the rinse. These tanks will be located in Room 245 of Building 444. This room was previously used as the plating laboratory. The excess chemicals have been removed; therefore, there will be no hazards due to chemical incompatibility. The hoods and air system for this room are designed for chemical exhausting, and beryllium has previously been coated in this room. The design of the room also provides confinement for any contamination associated with the coat stripping.

After removal of the coating, the beryllium parts will be crushed to reduce their size so they will fit into the furnaces for melting. This will be accomplished using a 25-ton press that will be moved from Building 883 to Building 444. The press will be located in the beryllium machine shop and shrouded to contain the broken pieces and powder created during crushing. The beryllium filters and controlled air flow in the beryllium machine shop will ensure that the beryllium in contained.

The final step in declassifying the beryllium parts will be melting. Prior to melting the beryllium parts, it will be necessary to rebrick two of the VIM furnaces, modify the induction coils to accommodate the new crucibles, and build a wall to isolate two furnaces. Building the wall will completely separate the ventilation system for these furnaces from the ventilation system for the furnaces used to melt the stainless steel. Different VIM furnaces will be used to melt the beryllium and stainless steel to avoid cross contamination.

3.6.3 Depleted Uranium Items

Complete declassification of all of the depleted uranium parts will be accomplished by melting. MSC will accomplish this task using a fourth VIM furnace, to avoid cross contamination.

3.6.4 Steel Tooling

The steel tooling will be melted in the same VIM furnace that will be used to melt the stainless steel items.

3.6.5 Aluminum Tooling

The aluminum tooling will be melted in the same VIM furnace that will be used to melt the stainless steel items and the steel tooling.

3.6.6 Miscellaneous Classified Parts

There is a smaller quantity of classified parts made of tantalum, vanadium, copper, titanium, and other materials that will be crushed and rolled to eliminate the classified properties. The intended final disposition of this material is to sell it as scrap. Current plans are for the M&O contractor to perform the declassification of this material.

3.7 NCPP Occupational Safety and Health Program

The strategy for developing the NCPP Safety and Health (S&H) Program is based on using existing plant program elements, as appropriate; eliminating elements not relevant to the Stage II work; enhancing those elements that may benefit from upgrading; and incorporating new elements, based on the information obtained during Stage I of the NCPP.

MSC has a rigorous S&H program in use at its Oak Ridge facility, where activities very similar to the proposed NCPP activities are implemented. Rather than develop a new NCPP S&H program, the NCPP will use the existing EG&G S&H program and MSC's Oak Ridge S&H program, and combine appropriate elements of each to effectively serve the needs of cleanup operations of the NCPP facilities. This will allow the NCPP to use those portions of the existing Safety and Health Plans that have been proven effective and to modify or eliminate other portions based on actual experience in the same environment to develop an NCPP-specific S&H program.

There will be aspects of the EG&G S&H program and MSC's Oak Ridge S&H program that do not apply to the NCPP. For instance, those portions of the EG&G S&H program dealing with plutonium will not apply, as none of the NCPP activities deals with plutonium. There will be other similar areas, but for the purposes of this IM/IRA Decision Document, they will not be enumerated.

Enhancements to current EG&G and MSC S&H elements and addition of new elements will provide the NCPP with an S&H program that not only meets the current regulations, but affords the workers and the public with the assurance that work under the NCPP is being performed to the highest safety standards.

3.7.1 Beryllium Safety

To ensure the health and safety of the workers in Stage II, a beryllium monitoring program will be implemented that uses the latest technology, along with well-proven existing technologies to determine the existence and amount of beryllium in the immediate area of the workers. Several

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real-time beryllium monitors will be used to provide virtually immediate results, which will be compared with the data from other beryllium monitoring. By analyzing all of the beryllium data, the levels of beryllium in the immediate vicinity of the workers will be available, allowing activities to be modified, as needed, to reduce the exposure to beryllium. Primary data used for decisions on modifying controls on personal protective equipment will be obtained from breathing zone air samples.

Additionally, each cleanup worker will be issued a personal beryllium sampler to be worn on outer garments and in close proximity to the breathing zone. MSC has extensive experience working with beryllium, including beryllium health and safety. One of the founders of MSC, Dr. Dennis Floyd, is an internationally recognized beryllium expert who has worked with beryllium for his entire 30-year professional career. Dr. Floyd is the author of the latest book on beryllium and his 1993 paper, "Environmentally-Conscious Beryllium Manufacturing," co-authored with Los Alamos experts, includes descriptions of the latest technology for minimizing worker exposure to beryllium health hazards.

The other MSC founder, Dr. Alan Liby is a permanent member of the beryllium monitoring subcommittee of the joint DOE/DoD beryllium coordinating committee. MSC conducts beryllium manufacturing operations in its Oak Ridge facility. MSC adheres to among the strictest guidelines for beryllium contamination control practiced by industry in the United States. This includes analyzing 50 beryllium monitoring samples daily, reporting these results graphically to the workforce, terminating work activities until corrective actions are made to beryllium operations where air samples exceed 10% of the allowable limit of 2 micrograms per cubic meter, and including beryllium reviews in monthly safety meetings. Similar precautions will be taken in the NCPP Stage II cleanup activities. All beryllium sampling and monitoring activities will be managed under the auspices of the NCPP Health and Safety Program.

3.7.2 Radiation Safety

title 10 CFR 835 stipulates that DOE activities shall be conducted in compliance with a documented Radiation Protection program (RPP) as approved by the DOE. The NCPP Occupational Safety and Health Program promulgates the RPP for the NCPP. It also sets forth the radiation protection standards, limits and program requirements for the protection of individuals from occupational exposure to ionizing radiation resulting from NCPP activities.

Although it has bee agreed between the DOE and MS that Stage II activities will transition from DOE oversight to State and Department of Labor oversight, the elements of 10 CFR 835 are similar enough to 10 CFR 20 and respective Colorado Agreement State requirements that it is to the benefit of MSC to develop its RPP at this time in accordance with 10 CFR 835. The RPP covers operations intended to be performed by MSC in the NCPP buildings.

To protect the NCPP workers, as well as the public, a radiation monitoring program will be implemented as follows. Breathing zone sampling will be performed in accordance with potential for aerating radioactive material during the cleanup task.

Monitoring of individuals and areas will be performed to demonstrate compliance with 10 CFR 835.401, to document radiological conditions in the workplace, to detect changes in radiological conditions, to detect the gradual buildup of radioactive material in the workplace, and to verify the effectiveness of engineering and process controls in containing radioactive material and reducing radiation exposure. Workplace area monitoring for radioactive material will be performed to quantify and record average airborne concentrations.

Area monitoring in the workplace will be routinely performed, as necessary, to identify and control potential sources of personnel exposure to radiation and/or radioactive material.

Other methods to be used to protect the NCPP workers include entry control, posting and labeling, use of standard procedures, providing radiation safety training, and implementation of a behavior based safety program, on which individual performance evaluations will be based.

The NCPP Occupational Safety and Health Program, which has been summarized here, contains the detailed information describing the program and associated activities.

3.8 Quality Assurance Program

At the onset of Stage II, prior to the commencement of operations, a Quality Assurance Program will be developed to control activities and ensure that products and services meet governing requirements and the requirements of internal and external customers. These products and services include sampling, cleanup, declassification, process verification, and the associated health and safety components. The program will be designed to meet the intent of DOE Order 5700.6C, Quality Assurance, and will embrace Total Quality Management (TQM) principles that delegate responsibility for process improvement to trained process owners.

DOE Order 5700.6C, Quality Assurance, is functionally organized by management, performance, and assessment. Table 3-4 depicts the Stage II Quality Assurance Program Structure and how the functional elements of the Order apply to the structure. While this simplified depiction represents the interaction between program elements and the Order, overlap exists since the Order influences all aspects of the program.

Figure 3-2 accurately depicts the hierarchy of the Quality Assurance Program as being the upper-most program from which all other programs are developed and implemented. Accordingly, the Quality Assurance Program is the means by which Stage II will be developed and implemented.

As indicated in Figure 3-2, the assessment function envelops the performance and management activities, and provides a measurable means of determining program effectiveness and compliance. In accordance with the Order, assessment is the broad term that embraces surveillance, audit, and both independent and self assessment activities. Assessment combined with process owner initiated improvements result in continuous improvement of the program and overall effectiveness.

Table 3-4 Quality Assurance Program Structure

Management	Performance	Assessment
Program	Work Processes	Management Assessment
Personnel Training & Qualification	Design	Independent Assessment
Quality Improvement	Procurement	
Documents and Records	Inspection & Acceptance Testing	

Development of the Quality Assurance Program, while meeting the intent of DOE Order 5700.6C, Quality Assurance, will also incorporate direction as appropriate from source documents, including, but not limited to:

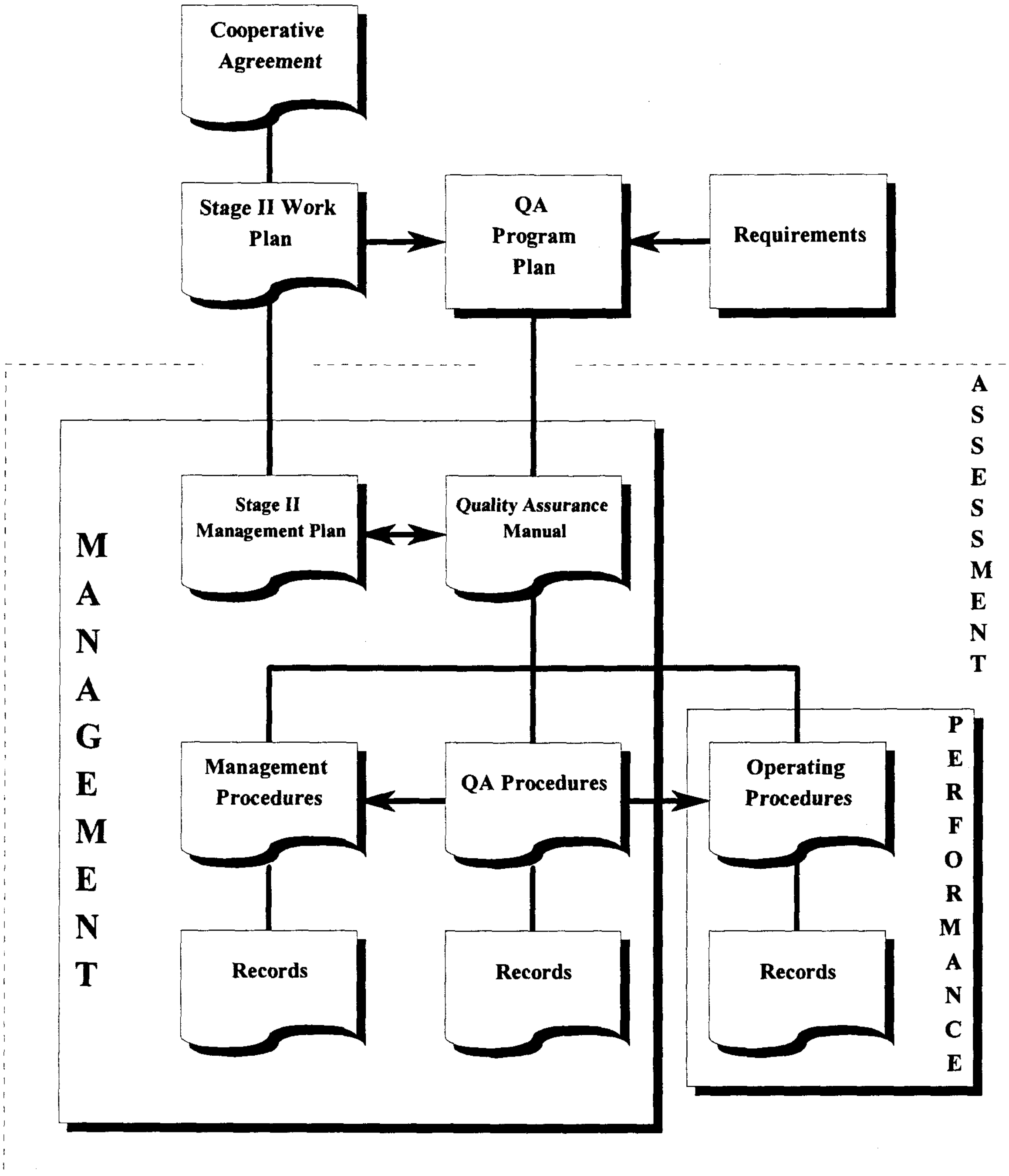
- ANSI/ASQC E4, Quality Assurance Program for Environmental Programs
- ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities
- ASTM C1009, Standard Guide for Establishing A Quality Assurance Program for Analytical Laboratories
- DOE-EM, Quality Assurance Requirements and Description
- 10 CFR 71, Subpart H, Quality Assurance
- EPA QAMS 005/80, Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans
- 10 CFR 21, Reporting of Defects and Noncompliance

In addition, development of the Quality Assurance Program will consider control elements, requirements, and guidance from quality assurance programs that are currently being utilized in commercial industries, such as the ISO 9000 (ANSI/ASQC Q90-1987) series.

The procedures depicted in the figure will be developed utilizing a graded approach, by which the degree of control is commensurate with the risk of the activity or process. This approach reduces the cost of program implementation, while insuring safe operations and minimizing the risk to the public, environment, workers and facilities.

Implementation of the Quality Assurance Program will be carried out by employees that have received training that provides them with the appropriate tools and skills to meet the quality objective, and to actively participate in the continuous improvement process.

Figure 3-2 Stage II Quality Assurance Program Structure and Basis



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3.9 Regulatory Issues

In addition to the other Stage II activities, there are several regulatory issues that will be managed. These issues can be divided into three main categories: new/revised regulatory documents; transition from DOE Orders to other applicable regulations; and permits/licenses applicable to Stage II and Stage III.

Since the onset of the NCPP, a Steering Committee has been in place to determine project-specific policy and respond to project-related issues. The Steering Committee is presently composed of members from each of the following organizations: MSC, DOE-RFFO, EPA, CDPHE, Rocky Flats Local Impacts Initiative, EG&G, and the Colorado Office of Business Development. By involving these interested parties, including the regulators in this process, regulatory issues can be dealt with more quickly and efficiently. The Steering Committee, while having no regulatory authority, provides the project with a forum where regulatory issues can be discussed, and guidance for the project is developed. A monthly update detailing activities conducted during the previous month and those anticipated for the upcoming month will be provided to this Steering Committee, as well as the regulators and the DOE.

Over the course of Stage II, it is possible that new regulations or revisions to current regulations applicable to the NCPP will be enacted. In the event this happens, the impacts of the new/revised regulation will be researched by MSC, and a proposed method of responding to the regulation will be presented to the Steering Committee. The Steering Committee will then provide guidance on implementation, based on input from the Steering Committee members. Implementation will then be carried out by the appropriate organization(s).

This category of regulatory issues also includes any modifications to this IM/IRA that may be required. This IM/IRA has considered all known information applicable to Stage II and once approved, all Stage II activities will be performed in accordance with this IM/IRA. However, during Stage II, it may be necessary to modify the IM/IRA based on new or previously undiscovered information. In this case, a modified IM/IRA will be developed and approved using the appropriate process employed under CERCLA and RCRA/CHWA. In the event that a change to the IM/IRA is required, the NCPP will coordinate with the regulators to identify the appropriate process for keeping the public informed and modifying the IM/IRA on a case-by-case basis.

The second category of regulatory issues is the transition from DOE Orders to other applicable regulations. Since the NCPP buildings and the activities in them are on a DOE facility, they are subject to the DOE Orders as well as the regulations that apply to private business performing the same activities. There is some duplication between these sets of regulations that will need to be eliminated if the NCPP buildings are to be converted for use by a private business.

Additionally, there are some DOE Orders that will not apply to a private business. The transition away from the DOE Orders will be handled in a manner similar to that explained for new/revised regulations. That is, the DOE requirements that are either duplicative or not applicable to private businesses will be identified by MSC, and a proposed method of eliminating these requirements will be presented to the Steering Committee. The Steering Committee will either accept the proposal, or modify it before acceptance. The implementation will then be documented and carried out by the appropriate organization(s).

Some of the regulations that may be duplicated by DOE Orders are:

- Clean Water Act
- Clean Air Act
- Colorado Hazardous Waste Regulations
- Toxic Substance Control Act
- Hazardous and Solid Waste Amendments

The third category of regulatory issues to be managed during Stage II deals with permits/licenses applicable to Stage II and Stage III activities. As a result of the Stage II activities, sampling data for air emissions will need to be collected and reported to the CDPHE. The vehicle to be used for this reporting is the RFETS Air Pollution Emission Notice (APEN). MSC will provide the M&O contractor with the information needed to modify the APEN. APENs are discussed in greater detail in Section 5.1.

Another permit related to Stage II activities deals with the storage of low level mixed waste in the NCPP buildings during Stage II. This subject is discussed in detail in Section 4.2.2; but is mentioned in this section for completeness. The approved IM/IRA will serve as the permit for MSC to store low level mixed waste generated in Stage II in the NCPP buildings during Stage II. Additionally, the IM/IRA specifies the activities necessary for the closure of these container storage units.

If Stage III is pursued, the administrative vehicle for Stage III will not be an IM/IRA. For Stage III, the normal permitting and licensing process for private businesses will be used. Although the performance of Stage III is not a certainty, the application for permits and licenses foreseen as necessary for Stage III will be submitted during Stage II. The applications will be submitted during Stage II due to the lead times involved in obtaining these permits and licenses.

It needs to be stated that this IM/IRA does not preclude compliance with all regulations applicable to the NCPP.

4.0 Waste Management

4.1 Anticipated Waste Generation

As a result of the cleanup work to be carried out in Stage II, waste will be produced. The volume of waste that will be generated from cleanup activities (decontamination and dismantling) will be significant. Waste will originate from several sources and can be categorized into two basic groups.

1. Primary waste - waste directly arising from dismantling operations such as cut-up equipment, fire bricks removed from ovens, oil, plastics, salts, etc.

2. Secondary waste - waste arising from the decontamination/dismantling operations themselves. Waste arising from decontamination operations includes items such as swabs, decontamination liquors, etc. Secondary waste arising from dismantling operations includes items such as protective clothing, saw blades, etc.

4.1.1 Waste Generated During Cleanup Activities

Table 4-1 describes the typical waste that will arise during the cleanup operations. This table lists the forms of waste expected to be generated by each of the 10 steps of the cleanup plan that are described in Section 3.2, Cleanup Activities.

Table 4-1 Primary and Secondary Waste Forms Generated During Stage II Activities

Step No.	Primary Waste Form	Secondary Waste Form
1	tools, benches, cabinets, toolboxes, pallets	minimal
2	minimal	swabs, decontaminating solutions, cloths, protective clothing
3	none	swabs, decontaminating solutions, excess construction materials
4	equipment removed from building (whole or sectioned)	swabs, decontaminating solutions, protective clothing
5	equipment removed from building (whole or sectioned)	swabs, decontaminating solutions, protective clothing, strippable coatings, HEPA filters
6	equipment removed from building (whole or sectioned)	swabs, decontaminating solutions, protective clothing, strippable coatings, HEPA filters

Step No.	Primary Waste Form	Secondary Waste Form
7	dust, removed building materials	swabs, flushing solutions, protective clothing
8	materials discarded during maintenance operations (belts, hydraulic hoses, seals)	swabs, decontaminating solutions
9	materials discarded during maintenance operations (belts, hydraulic hoses, seals)	swabs, protective clothing, decontaminating solutions, HEPA filters
10	minimal, possibly small items removed for contamination reduction purposes	swabs, decontaminating solutions, containment materials

During Stage I, a report presenting an estimate of the waste to be generated by the NCPP was developed to support the preparation of the Rocky Flats Plant Waste Management Plan. This report was developed to provide the best estimate available of waste types and quantities expected to be generated during cleanup of NCPP buildings and equipment. Table 4-2 is a summary of the waste estimation developed during Stage I. The table lists the estimated quantity of primary and secondary waste and oil arising from decontamination and/or dismantlement of the NCPP buildings and associated equipment. This information has been developed from the equipment lists appearing in the Facility Cleanup Plan. As expected, the primary waste arising from equipment being dismantled forms the majority of the primary waste quantities identified. Primary waste from items subject only to cleaning and maintenance will, in general, be limited to those materials replaced during the maintenance of the equipment (e.g., fire bricks, seals, hydraulic hoses). Secondary waste, in general, arises during decontamination operations as contamination is transferred from one medium to another.

Table 4-2 Estimated Quantities of Waste Generated in Stage II

	Primary waste (ft^3)	Secondary waste (ft^3)	Used oil (ft^3)
Building 865	7,712	1,864	305
Building 883	14,180	1,590	307
Building 444/7	40,773	5,458	932
Total	62,665	8,912	1,544

4.1.2 Waste Generated During Declassification and Process Verification Activities

Process verification activities are discussed in Section 3.3, and declassification activities are discussed in Section 3.5. Each of these activities will generate some waste. Like the waste from cleanup activities, the waste that is generated in these activities will be managed under the auspices of the NCPP Waste Management Plan (Section 4.3).

During process verification, the following types of waste will be generated: metal chips, welding electrodes, rags, and process wastewater. Most of the waste will consist of stainless steel, beryllium, carbon steel, depleted uranium, and copper machining chips. These chips are anticipated to account for approximately 1,600 pounds, or ten 55-gallon drums. All machining chips will be managed as low level light metal or uranium waste. Welding electrode stubs will be managed as low level waste. A very small quantity (less than 10 cubic feet) of waste rags will be generated during this work by wiping off excess lubricant. Finally, approximately 1,000 gallons of solid/liquid waste will be generated by filtering particulates out of cooling water used in the rolling and annealing processes.

Waste generated during declassification will consist of metal oxides from the melting process and the crucibles used in declassification. The crucibles are made of aluminum oxide or graphite. This waste is estimated at approximately 5% (13,600 pounds) of the weight of the material to be declassified.

The wastes generated from declassification and process verification activities will be managed under the same program used to manage cleanup wastes. This program is discussed in Section 4.2.

4.2 Waste Characterization, Storage, and Disposal

Primary and secondary wastes will be segregated into low level waste (LLW) and low level mixed waste (LLMW). The waste characterization for LLW or LLMW will, in most cases, be based on process knowledge. This process knowledge will be augmented with analytical data to fully characterize the waste. Where process knowledge is not sufficient to characterize the waste, the waste will be managed by MSC under the more rigorous LLMW category until analytical data are available to complete the characterization.

Each building has a Waste Stream and Residue Identification and Characterization (WSRIC) book that will be used to identify and characterize the waste streams through the collection of process knowledge and analytical data to determine which streams should be characterized as Land Disposal Restricted (LDR) material. Non-routine wastes that are not described in the WSRIC books will be characterized using the Non-Routine Waste Origination Log. The characterization will be documented and approved. The approved characterization documentation must accompany the waste container and be maintained as a certification record. In the unlikely event that enriched uranium contamination is encountered, DOT regulation 49 CFR 173.403 (n) Hazardous Materials Regulations - General Requirements for Shipments and Packaging will be adhered to. This regulation limits U-235 content to 15g per drum.

Cleanup waste generated during Stage II will be subject to RCRA authority and enforced by the Colorado Hazardous Waste Act (CHWA) and DOE Orders for the purposes of treatment, storage, and/or disposal. The Site Support Services Memorandum of Agreement has been put in place to help ensure that the NCPP activities, including management of cleanup waste, do not interfere with other RFETS activities currently being performed.

As discussed in Section 3.2, Cleanup Activities, not all of the metallic items to be cleaned or dismantled will become waste. Under the NCPP, some equipment will be retained for use during Stage III, some will be decontaminated and free released, and some will become feedstock for Stage III recycling. This reuse and recycling of equipment will greatly reduce the volume of waste generated by cleaning the buildings. Table 4-3 compares the volumes of LLW and LLMW expected to be generated with the volume of recyclable materials anticipated to be set aside as feedstock for Stage III. These volumes do not include any size/volume reduction. If an allowance is made for size or volume reduction, then these estimated volumes can be reduced. Various volume reduction percentages are possible for all waste streams, due to the variation in density and compressibility of the materials. As the table shows, strong consideration has been and will continue to be given to minimizing the generation of waste by reusing and recycling as much material as possible. The criteria for determining whether material are recyclable is based on the economic value of recycling the material and on minimizing the impact on the health and safety of the workers.

Table 4-3 Comparison of Waste and Recyclable Material Volumes

Building	Recycle Materials (ft^3)	Low Level Waste (ft^3)	Low Level Mixed Waste (ft^3)
865	139,060	7,118	2,763
883	108,889	13,490	2,587
444/7	88,304	32,887	14,276
Total	336,253	53,495	19,626

4.2.1 Low Level Waste

Once LLW has been properly packaged, it will be managed by the M&O contractor. Control measures (e.g., procedures, inspections, real-time radiography) will identify any improper packaging. Any rejected container will be returned to MSC for repackaging. Once solid and liquid LLW generated during Stage II has been determined to meet the waste acceptance criteria, it will be managed by the M&O contractor, as specified in the Site Support Services Memorandum of Agreement. Solid LLW will be packaged for eventual disposal at the Nevada Test Site (NTS). The LLW will be moved to low level waste storage areas at RFETS. No LLW will be stored in the NCPP buildings. The primary LLW type includes items such as belts, metal, hydraulic hoses, glass and ceramics, wiring, graphite, firebricks, and plastics. The secondary LLW consists mainly of personal protective clothing, combustible materials, and HEPA filters.

As shown in Table 4-3, more LLW will be generated than any other waste category. All LLW will be segregated by item description code (IDC). Most of the waste will meet the conditions of the NTS Defense Waste Acceptance Criteria, Certification, and Transfer Requirements NVO-325, Revision 1, as defined by the EG&G Rocky Flats Low Level Waste Management Plan. Waste streams that do not meet these conditions will be addressed by the NCPP Waste Management Plan, which will be developed early in Stage II (Section 4.3).

Waste salts from the removal of equipment will be packed in metal containers and capped. By capping the containers, moisture is prevented from reaching the salt. In the absence of moisture, the salts are non-corrosive and remain in their solid state.

Several of the proposed cleanup technologies will generate aqueous waste. These waste streams have either been identified and characterized as non-hazardous based on process knowledge or can be rendered non-hazardous through elementary neutralization. Any oils from cleanup activities that may be mixed with the aqueous waste will be removed to allow treatment of the aqueous waste. See Section 4.2.5 for discussion of how oils will be managed.

Approximately 450 gallons per day of this aqueous waste may be transferred to the RFETS Liquid Waste Treatment Operations (LWTO). The aqueous waste will be tested as necessary to ensure that the LWTO waste acceptance criteria are met. Each of the NCPP buildings has liquid storage tanks that are managed by the M&O contractor as interim status tanks. In accordance with the Site Support Services Memorandum of Agreement, the M&O contractor will perform the activities to close the tanks in each NCPP building under RCRA criteria (6 CCR-1007-3,265 Subpart J) prior to hands-on cleanup activities in the building.

4.2.2 Low Level Mixed Waste

The LLMW that will be generated during cleanup activities will contain depleted uranium and materials regulated under CHWA. Presently, there is no disposal site for LLMW, but the possibility exists that in the near future, mixed waste may be disposed at Envirocare in Utah. The primary LLMW type consists mainly of scrap metal and circuit boards contaminated with hazardous constituents. Paint chips and dust and particulates from dry and wet vacuuming will also fit into this type but will be generated in smaller quantities. Secondary LLMW will be generated during decontamination, but volume and form will depend on the level of cleanup. Waste solvents and some combustible materials may need to be managed as LLMW.

MSC as the waste generator will determine if the generated waste is a hazardous waste. The M&O contractor's Hazardous Waste Requirements Manual establishes all requirements for generating, segregating, packaging, and transferring hazardous and mixed wastes at RFETS. All applicable requirements of the Hazardous Waste Requirements Manual will be satisfied during Stage II activities. LLMW will be managed to satisfy the regulatory requirements as they are outlined in the Rocky Flats RCRA Part B Operating Permit.

Satellite collection areas will be established where LLMW will be generated. Up to 55 gallons of mixed waste may be stored in these satellite collection areas. Weekly inspections will be performed in order to monitor the condition of the containers. The weekly inspections will be performed by RCRA custodian and documented.

After a LLMW container has been filled in the satellite collection area and closed, it will be moved to a 90-day accumulation area located in the NCPP buildings. These 90-day accumulation areas will be managed and inspected by MSC. The inspections will be on a weekly basis, within 7 calendar days, in order to monitor the condition of the stored containers and the integrity of the containment system. Each stored container will be accessible and inspectable without moving any other container. MSC may accumulate waste in the NCPP building accumulation areas for 90 days or less. Within 90 days of the date an accumulation begins, the LLMW must be moved to a permitted storage unit managed by the M&O contractor. Once the waste has met the waste acceptance criteria and has been moved to the permitted storage unit, the M&O contractor will be responsible for the ultimate storage, treatment and/or disposal of the waste.

4.2.3 Hazardous Waste

The Stage II cleanup activities will occur in RCAs. Therefore, most of the waste will be either LLW or LLMW. At this time, no waste has been identified that will fit into the hazardous waste or solid waste categories. As waste is generated, it will be surveyed, and if non-radiologically contaminated hazardous waste or non-radiologically contaminated mixed (e.g., metals/asbestos) waste is identified, it will be moved directly to a permitted storage area to avoid radiological contamination. If straight solid waste is identified, it will be disposed of at the landfill.

4.2.4 Asbestos and Beryllium Contaminated Waste

Some of the piping and equipment to be decontaminated and/or dismantled has asbestos on or in them. The asbestos will be stabilized or stripped from the piping and equipment by a state-certified asbestos contractor before being dismantled. Low level asbestos waste may be transported to Hanford for disposal, with special approval. See Section 3.1, Sampling for a discussion on asbestos handling.

Waste from areas where work with beryllium was performed will contain traces of beryllium. This waste will be segregated from other wastes and managed separately to minimize the spread of beryllium. The waste containing beryllium will be managed as either LLW or LLMW, depending upon its constituents. Section 3.1, Sampling, contains a discussion on beryllium handling.

4.2.5 Reusable Materials

Waste oil drained from equipment and oil from oil/water separation will be consolidated in 55-gallon drums and managed in accordance with 6 CCR 1007-3. The waste oils that are hazardous because they are characteristic or because they are listed will be managed as mixed waste oil while non-hazardous waste oil will be managed as low level waste oil.

Freon gas removed from equipment will be reclaimed into cylinders for reuse in air-conditioning equipment on plant site.

Non-hazardous copper piping, aluminum, nickel, and brass that cannot be used in Stage III, but are of economic value will be decontaminated, when practicable, to levels for unconditional release.

4.3 NCPP Waste Management Plan

The primary goal of the NCPP Waste Management Plan is to reduce both the amount and toxicity of waste generated during the cleanup of the NCPP buildings. The NCPP Waste Management Plan will be formalized and issued prior to commencement of Stage II cleanup operations to implement the requirements and responsibilities for waste management.

The NCPP Waste Management Plan will specify regulatory requirements and DOE orders. The plan will contain appropriate procedures for waste stream characterization, packaging, storage, inspections, quality assurance, spill response, and waste minimization. Initially, the plan will be based on the existing M&O contractor's Waste Management Plan. This will be modified, as appropriate, to meet the needs of the Stage II activities and the anticipated Stage III activities.

4.4 Waste Permitting Requirements

A notification and a Waste Analysis Plan will be filed with the Director of CDPHE at least 30 days prior to commencement of treatment activities, as required by 6 CCR 1007-3, 100.21 (d)(2) Generator Treatment. The notification and Waste Analysis Plan will be filed to compact mixed waste to reduce its volume.

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5.0 Comparison with the "No-Action" Alternative

This section discusses the NEPA values regarding the proposed action in Buildings 865, 883, and 444/7 as described in Section 3.0. The effectiveness and implementability of the Proposed Action are evaluated CERCLA, and NEPA values specifically consider the impacts of the Proposed Action on human health and the environment.

5.1 Environmental Evaluation of Proposed Action

Traditionally, NEPA values such as wetlands and floodplains, threatened and endangered species, and cultural resources are addressed. However, this project is located inside facilities in an industrial area at the RFETS. The activities involved in the Proposed Action are virtually the same as the activities that were performed in these buildings in the past within the building safety systems and were described in the Rocky Flats Plant Final Environmental Impact Statement (DOE, 1980). As a result, these traditional NEPA values are not addressed in this IM/IRA Decision Document. The NEPA values that are addressed in this IM/IRA Decision Document are Air Quality Impacts, Water Quality Impacts, Personnel Exposure, Socioeconomic Impacts, Transportation Impacts, and Cumulative Impacts.

5.1.1 Air Quality Impacts

National Emission Standards for Hazardous Air Pollutants (NESHAPs) govern both radioactive and nonradioactive pollutants and are administered by the EPA or the CDPHE. The CDPHE has been granted authority by the EPA to regulate several hazardous air pollutants, including beryllium, mercury, vinyl chloride, and asbestos; however, authority to regulate radionuclides currently resides with the EPA.

Currently, building ventilation exhausts are monitored for both radiological and non-radiological (beryllium) air emissions, which must be maintained within the prescribed levels permitted. Consequently, the Stage II activities will be monitored by the existing ambient air monitoring program.

Particulate release could result from equipment operation during declassification and operational assessment activities and removal of loose contaminants during decontamination activities. However, as explained below, the levels of release expected are well below the guidelines adopted by the DOE, CDPHE, and EPA. Air is first filtered through multiple stages HEPA filters before it is exhausted from the stacks of the NCPP buildings. The emissions through the stacks are monitored for emission of radioactive particulates, beryllium; therefore, any release would be measured.

Colorado Air Quality Control Regulation #8 (Title 5 CCR 1001) implements NESHAPs for nonradioactive pollutants in Colorado. Work standards, emission limitations, and ambient air standards for hazardous air pollutants are specified in this regulation. Potential hazardous air pollutants of the NCPP include asbestos and beryllium.

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5.1.1.1 Radioactive Releases

Currently, the authority to regulate release of radionuclides to the environment lies with the EPA. Under the present regulation, NESHAPs limit the radiation dose to members of the public from airborne radionuclide emission from DOE facilities to 10 millirem per year at the site boundary. Generally, particulate material samples from a continuous sampling system are removed from each exhaust system twice each week, downstream from the final stage of HEPA filters and are radiometrically analyzed for long-lived alpha emitters. The concentration of long-lived alpha emitters is an indicator of effluent quality and overall performance of the HEPA filtration system. If the total long-lived alpha concentration for an effluent sample exceeds the RFETS action guide of 0.020 pCi/m^3, a follow-up investigation is conducted to determine the cause and evaluate the need for corrective actions. The action guide value is equal to the most restrictive off-site derived concentration guide (DCG) for plutonium activity in effluent air, adding more conservatism to the process.

At the end of each month, individual samples from each exhaust system are composited into larger samples by location. A portion of each dissolved composite sample is analyzed for beryllium, and the remainder is analyzed for alpha-emitting radionuclides. Analyses for uranium isotopes are conducted for each composite sample.

The DCGs are guidelines that have been adopted by the DOE, CDPHE, and EPA and are based on recommendations published by the International Commission of Radiological Protection and the National Council on Radiation Protection and Measurements. DCGs are concentrations that would result in an effective dose equivalent of 100 mrem from one year's chronic exposure or intake. These guidelines were developed for each radiological isotope to protect the public health and welfare.

The total average concentrations of uranium in ambient air released during past operations of the NCPP buildings were 6.22x10^{-3} (0.00622) pCi/m^3 for 1978 and 9.11x10^{-5} (0.0000911) pCi/m^3 for 1993 (Rocky Flats Plant Site Environmental Reports). These measurements are 15 and 1,000 times lower, respectively, than any of the DCGs for individual uranium isotopes, which are:

Uranium-233	0.09 pCi/m^3
Uranium-234	0.09 pCi/m^3
Uranium-235	0.1 pCi/m^3
Uranium-238	0.1 pCi/m^3

5.1.1.2 Asbestos Releases

Asbestos was used as insulation in the older facilities and equipment and will be handled according to NESHAPs regulations during dismantling activities. All asbestos handling will be performed by state-certified asbestos contractors, and the notification requirements of the Air Quality Control Commission's Regulation #8 will be adhered to.

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5.1.1.3 Beryllium Releases

The quantity of beryllium discharged during past operations of the NCPP buildings was 0.17 grams for 1988 and 0.84 grams for 1993. Beryllium results started to increase in 1989 as a result of the discontinuation of background correction (Rocky Flats Plant Site Environmental Report). Both of these values are far below the beryllium stationary source emission standard in the CDPHE Regulation #8 "The Control of Hazardous Air Pollutants", which is 10 grams over a 24-hour period, which would be 3,650 g/year compared to the less than 1 gram actually released. The CDPHE Regulation #8 also states that the ambient concentration of beryllium at the property line of a stationary source shall not exceed $0.01 \mu g/m^3$. To ensure that beryllium releases will not exceed the stationary source standard during Stage II activities, effluent monitoring of beryllium will be performed. The acceptability of the monitoring criteria will be approved by APCD.

It is expected that Stage II activities (operational assessment, declassification, and cleanup) will generate some airborne emissions. However, the air emissions for beryllium and depleted uranium are not expected to increase significantly above levels measured in the most recent years, and particulate emissions measured during Stage II may be less than releases during production years. As explained above, these levels are well below the allowed levels in CDPHE Regulation #8. The releases of beryllium will be kept below the Regulation #8 stationary source standard by the use of additional containment equipment and systems and continuous real time contaminant monitoring instruments that will be installed inside the buildings during cleanup, which have not existed in the past. Cleanup technologies, localized modular containment to control air emissions, and other control devices are described in detail in the Facility Cleanup Plan and in preceding sections.

5.1.1.4 Volatile Organic Compound Releases

There will be some organic compounds used during Stage II. The possible releases from these compounds will be minimized by minimizing the use of the compounds. Due to the use of organic compounds during Stage II, the RFETS Air Pollution Emission Notices (APENs) must be modified to account for the additional quantities of these compounds. The APEN is an inventory form that identifies emission information for air pollution sources. APENs are required by Colorado Air Quality Control Regulation #3 for a new or modified emission source. The Colorado Air Quality Regulations require reporting of total VOC emissions exceeding 2,000 pounds per year. In addition, some of the compounds that will be used during Stage II must be reported if their use exceeds 250 pounds per year individually. APEN modifications will be necessary for Stage II to inventory the emissions from the acids and solvents that will be used for decontamination activities. However, the use of these chemicals during Stage II cleanup will not affect the Clean Air Operating Permit, as CERCLA cleanup activities and emissions resulting from these activities will be managed under the NCPP IM/IRA Decision Document.

5.1.1.5 Impact of Decontamination and Refurbishment Activities on Air Emissions

Decontamination and refurbishment work is not expected to have appreciable impacts on air emissions of uranium. Existing HEPA filtration units in the NCPP buildings have an efficiency of 99.95 % in the removal of airborne particulates of 0.3 micrometers or larger. The incorporation of additional HEPA air emission controls at the source of decontamination and refurbishment activities (inside the structured modular containment) further decrease the impact of these activities on emissions into the surrounding rooms, and thus through the building exhaust systems. To ensure that impacts are minimized, stack monitoring will continue during decontamination and refurbishment activities. Additionally, air within modules and air in the workplace which is immediately outside the modules will be sampled daily. Any increased values for airborne contaminants above target levels will be managed to ensure that impacts are minimized.

5.1.2 Water Quality Impacts

No impact is expected to the ground water and surface water quality. Cleanup activities occur inside the buildings, and any spills of cleanup liquids will be contained inside the buildings. It is expected that at peak usage, approximately 3,000 gallons per day per building of wastewater will be generated when water or steam is used for decontamination. COCs that are expected to be found in the cleanup water will be beryllium, depleted uranium, and traces of solvent residues from previous operations. The cleanup water will be pumped into waste receiving tanks. Each building has storage capacity for more than 3,000 gallons of cleanup water. The tanks will be used to collect the wastewater prior to sampling and to hold the wastewater until it can be transferred to and treated at the Liquid Waste Operations (Building 374). Water samples from these tanks will be analyzed by MSC to verify that the water meets the Building 374 waste acceptance criteria (e.g., quantity of organics, volume). If the constituents are within the acceptable limits, the wastewater will be released into the process waste lines for treatment in Building 374. If the water does not meet the Building 374 waste acceptance criteria, it will be ultra-filtered to remove the hydrocarbons, which would be the reason for not meeting the acceptance criteria. All discharges must be in compliance with applicable regulations and procedures. Any releases to the wastewater treatment plant will be treated in accordance with the RFETS National Pollutant Discharge Elimination System permit prior to discharge.

5.1.3 Personnel Exposure

A potential for personnel exposure has been identified and is described in Section 2.0, Current Conditions. Engineered controls and administrative controls shall be provided to prevent personnel exposure limits from being exceeded and to maintain exposure to ALARA levels. Major COCs identified are depleted uranium, beryllium, and traces of production solvent residues, which could cause potential health hazards to decontamination workers.

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Potential personnel exposure can result from the following pathways:

- Dermal and airborne exposure to beryllium or uranium and traces of production solvent residues from loose contamination
- Airborne exposure to beryllium and radionuclides while performing operational assessment activities
- Ingestion of beryllium and uranium in cleanup water or from loose contamination

A written Health and Safety Plan has been established and will be implemented in Stage II. This document will govern the cleanup activities that will be performed. The Health and Safety Plan will also describe the handling, usage, monitoring, and control of COCs during the cleanup and personnel and management responsibilities for health and safety.

There will be limited potential for dermal contact, as the Health and Safety Plan will specify the appropriate levels of personnel protection to be used. Also, the Health and Safety Plan will specify the appropriate personal protective clothing (e.g., respirators, gloves, goggles, protective clothing) to protect against inhalation and direct contact with contaminants. Airborne exposure of workers to radionuclides and beryllium are expected to be low. Operations will be performed in accordance with the Health and Safety Plan, which specifies appropriate levels of monitoring and personnel exposure protection. Additional sampling will be performed for the purpose of characterization of emission and exposures associated with decontamination. The Stage I Characterization Work Plan provides an initial list of COCs in all NCPP buildings. Specific sampling of these COCs will be initiated early in Stage II as it relates to the selection of personal protective equipment and exposure to cleanup workers. Furthermore, the potential for airborne radionuclides and beryllium exposures to other on-site personnel and the general public would be significantly less because all operations will take place within buildings. No additional releases are expected, as buildings have air control systems that collect and filter uranium, beryllium, and other particulate emissions. In the unlikely event that a release exceeds a permitted release standard, MSC and the DOE will immediately undertake procedures to mitigate any effects of such emission.

The potential for accidents resulting from Stage II operations is greatly reduced by the management approach adopted. Specifically, the Health and Safety Plan will be a source document for the development of training and procedures and will identify hazards that workers will encounter during the implementation of any work activity or plan. In addition, monitoring activities, through engineered and administrative controls, further reduce the risk of accidents. Although these controls reduce the probability of accidents being initiated, the Health and Safety Plan will also contain provisions to mitigate an accident in the event that an accident occurs. This feature is integral to the S&H Program and has direct interaction with site administrative controls to reduce the risk to collocated workers, the public, environment, and facilities.

Workers will be made familiar with the Health and Safety Plan and its requirements through training, and a copy of the plan will be available to workers in each building. During Stage II activities, accidents that could impact either workers or members of the public would include fires or transportation accidents. Potential releases of cleanup water within the buildings would not create a potential health hazard, unless the cleanup water would be ingested.

The use of acids and solvents during cleanup operations may contribute to odors within the confines of the building. The use of acids and solvents by decontamination workers will be strictly limited to those individuals who have been specifically trained on the appropriate procedures and are knowledgeable about the potential hazards. The use of these chemicals will be limited and effects controlled as necessary by ventilation. These chemicals and associated hazards will be controlled to the extent of not being hazardous to the workers in the buildings under normal conditions, nor would they be noticeable outside the buildings.

Spills of chemicals that may result from accident conditions will be administratively controlled by approved spill cleanup procedures. Spill response and reporting will be limited to those individuals who have been specifically trained on the appropriate procedures and are knowledgeable about the potential hazards. Spill response and reporting will be essentially the same as already in place at RFETS.

5.1.4 Socioeconomic Impacts

The NCPP Stage II cleanup activities consist of reducing contamination, which poses a risk to human health and the environment, and removing surplus equipment to allow for privatization. The cleanup activities will generate approximately 641 cubic yards (after compacting) of low level and low level mixed waste, which will be removed from the buildings by the end of Stage II. The effort would result in available space for recycling activities, decontaminated equipment for resale valued at $2.3 million, and scrap metal valued at $3.6 million.

The Northeast Land Use Inventory Map (Jefferson County, 1988) defines the RFETS as an A-2 zoning area with industrial land use. The Stage II cleanup activities would make 200,000 square feet of production space available for future economic development. In addition, approximately 207 otherwise displaced RFETS workers will be retrained for cleanup activities. It has been estimated that for every job gained at RFETS, roughly the same number of "indirect" or "induced" jobs will be retained in the surrounding communities. In addition, continuation of wages will maintain the sales tax revenues for area cities. The total payroll for these employees is estimated at $18 million or about 47 % of the total project cost. This will result in an estimated $45 million in economic benefits for the surrounding communities for the duration of Stage II (University of Colorado at Denver, Economic Impact of the RFP on Colorado Economy, 1988). Local economic benefits will include purchase of supplies and services from local sources in an amount estimated at $15 million annually.

Added positive financial benefits are reduction in security costs resulting from the declassification of classified parts and reduction of maintenance cost of the otherwise idle equipment and decrease in building surveillance costs.

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5.1.5 Transportation Impacts

The NCPP cleanup will generate low level waste contaminated with depleted uranium. Low level waste disposal is expected to occur during Stage II. The waste, which will be transported by truck, will be packaged and shipped in accordance with the appropriate DOT regulations, DOE orders, and internal regulations and requirements. The NCPP cleanup will also generate low level mixed waste. However, as there is currently no disposal facility for low level mixed waste, this waste will not be transported during Stage II.

5.1.5.1 Radioactive Waste Packaging Requirements

Waste packaging will adhere to DOT packaging requirements 49 CFR Parts 171-178 and DOE regulations. The radiation exposure rate from individual packages of radioactive material during normal conditions of transport is limited by DOT regulations. A surface exposure rate of no more than 200 mrem/hr and no more than 10 mrem/hr at 3 feet from the surface of the package is permitted. Two low level waste types, light metal and combustible waste, were the most common waste streams generated during production and will be during Stage II. During production, the surface exposure rates for light metal packaged in plywood boxes were reported between 0.0 to 1.1 mrem/hr with an average of 0.16 mrem/hr. For dry combustible waste packaged in plywood boxes, the surface exposure rates ranged between 0.0 to 2.0 mrem/hr with an average of 0.09 mrem/hr (. Rocky Flats Waste Environmental Management System data base). These measurements have been consistently below the DOT exposure limit, and measurements close to those from production years will be expected during Stage II. Before a waste container will be shipped off site for disposal, the surface exposure rate will be determined and recorded on the container to assure compliance with DOT regulations.

5.1.5.2 Waste Shipments

The transportation risk analysis of the 1980 Rocky Flats Final Environmental Impact Statement assessed transportation impacts by train and air and the impacts of about 500 shipments by truck of radioactive materials and about 850 shipments by truck of chemicals and nonradioactive materials to and from the plant annually. The destination of waste shipments included in the analysis covered mileage to several disposal sites. For example, in 1986, 189 waste shipments were made to the NTS. Since then, the number of radioactive truck shipments have declined. Based on the waste generation rate projections, approximately 50 to 65 waste shipments to NTS are expected during the two years of Stage II. The off-site shipments of radioactive waste are limited by weight (44,000 lbs) or number and size of containers (24 plywood boxes or 208 55-gallon drums). Waste shipments to NTS were addressed in the 1980 Rocky Flats Final Environmental Impact Statement.

Waste shipments will consist of cleanup waste with no reuse value such as light metals, combustible materials (wipes and personal protective equipment), graphite, firebricks, belts, rubber tubing, and plastics contaminated with depleted uranium and beryllium. On-site transfer of waste between buildings will be limited. MSC intends to safely store the waste in each building until it is shipped for disposal; therefore, the potential of exposure hazards to workers is limited.

An increase in shipments to the RFETS of nonradioactive materials and chemicals to be used in the cleanup process is expected in the beginning of Stage II in support of the NCPP. These shipments will also adhere to all applicable DOT regulations and DOE orders.

5.1.5.3 Transportation Safety

DOT hazardous material training and training regarding the information and requirements imposed by the Transportation Safety Act of 1990 will be required. All persons involved in packaging and shipping of waste and material will be trained and certified.

5.1.5.4 Emergency Response

The adherence to DOT regulations and DOE orders during Stage II will significantly reduce the potential for accidents. In the event an accident does occur, a comprehensive program for emergency planning, preparedness and response is in place at RFETS and will be utilized. The objective of this program is to minimize consequences to workers, the public, and the environment from incidents involving operations and the transportation accidents.

5.1.6 Cumulative Impacts

A "cumulative impact" is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Cumulative impacts will incorporate similar, previous IM/IRA actions in the same geographic location and consider environmental impacts and impacts from operations of the Proposed Action to on-site personnel and the general public.

The Proposed Action consists of operational assessment activities and cleanup activities to levels acceptable for commercial operations in these buildings.

5.1.6.1 Operational Assessment

A total of 272,000 lbs of material (beryllium, uranium, and stainless steel) will be declassified. Markings will be removed from the classified parts as necessary. Larger parts will be reduced in size for melting. Other parts can go directly to melting. After declassification, the material will be available for recycling.

In preparation for commercial operations, equipment will be tested for operational readiness, manufacturing processes will be developed, and product prototypes will be fabricated and tested.

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5.1.6.2 Cleanup

To prepare these buildings for economic development, the interior structural surfaces and associated equipment located will be decontaminated. The proposed cleanup consists of the removal of residual depleted uranium, beryllium, and chemical contaminants from previous activities. The cleanup is not believed to have any potential impacts not previously identified, because cleanup activities will be performed within the described buildings. Furthermore, activities will be performed to standards accepted by the DOE, CDPHE, and EPA for the continued protection of the health and safety of workers, the public, and the environment.

5.2 Environmental Evaluation of "No Action"

This section addresses the NEPA values of the No-Action Alternative. In this alternative, the site operations would continue as they exist today. Actual and potential radioactive and nonradioactive releases, their impact, and sources would remain unchanged. There would be little or no change in the regulatory framework, considerable emphasis on waste characterization, a gradual phasing into environmental cleanup, and a deferral of significant building cleanup.

5.2.1 Air Quality Impacts

The No-Action Alternative would not further impact the existing air quality as discussed in the Rocky Flats Final Environmental Impact Statement (DOE, 1980). The ventilation systems are designed to draw air from outside the buildings to contain the contamination inside the buildings. Additionally, contamination in air exhausted from the buildings is filtered using HEPA filtration systems. The facilities will be subject to degradation from lack of use and as they age, will require increased maintenance to prevent air quality impacts.

5.2.2 Water Quality Impacts

The No-Action Alternative will not have an impact on the ground water and surface water quality.

5.2.3 Personnel Exposure

The No-Action Alternative would have an impact on current workers involved in the NCPP buildings or at adjacent RFETS areas concerning personnel exposures. Workers would have to continue to monitor building safety systems at previously defined frequencies to ensure that potential personnel exposure risks are minimized. The doses received by surveillance workers would continue at the present levels until the buildings are decontaminated and decommissioned. By delaying the decontamination until a later date, the total dose received by surveillance personnel would be greater.

5.2.4 Socioeconomic Impacts

In the No-Action Alternative, present trends would continue. The results of this scenario would be continued surveillance and maintenance of storage facilities and unused buildings incurring non-recoverable costs. The hiring of approximately 200 personnel under the NCPP would not occur in the No-Action Alternative. The potential to employ up to 500 workers in future recycling will have been lost.

5.2.5 Transportation Impacts

Under the No-Action Alternative, there would be no additional low level waste shipments from building cleanup.

Fewer employees working at the facility would result in less business trips and less traffic congestion.

5.2.6 Cumulative Impacts

Because there are no additional remedial activities associated with the No-Action Alternative, there are no cumulative impacts identified.

6.0 Public Participation

Summary

Manufacturing Sciences Corporation (MSC), the private contractor performing the National Conversion Pilot Project, is committed to the public's right to be involved. The following activities are elements of an overall Public Involvement Plan being developed by MSC. The purpose of these activities and the plan is to provide several different avenues for the general public to learn about and participate in the NCPP.

Public Involvement Activities

1. Sounding Board

The NCPP Sounding Board is an informal public focus group consisting of representatives from community organizations, including city governments and environmental, business and economic development groups. The Sounding Board has provided feedback to the Steering Committee to help identify issues and assess the adequacy of issue closure. The Sounding Board will be convened during Stage II on an as needed basis to review critical cleanup issues as well has help with over all public involvement activities.

2. Public Tours

During Stage I the NCPP Steering Committee sponsored public tours. The purpose of these tours was to familiarize the public with the NCPP buildings and the proposed action. One of the first activities of Stage II was to remove the two security gates and fences surrounding the NCPP buildings to provide easier public access to these buildings. With the fence down, the public was invited to tour the facilities to learn more about the cleanup activities. Using mass mailings MSC provided the public with the necessary phone numbers and contacts to arrange a tour. Though these tours will be conducted by MSC, they will be coordinated with the "Plan-of-the-Day" activities of the Integrating Contractor.

3. Project Updates

MSC has developed a schedule for NCPP Project Mailings. The pamphlets will contain brief informational updates suitable for broad based mailings. The purpose of these updates is to bring to the attention of the general public significant milestones and or issues that arise during Stage II. Because it is not cost effective to mail large volumes of material, these update will notify key "Stakeholders" of important documents or activities that should be reviewed for public comment.

4. Public TV

Local governments in the Rocky Flats area utilize Channel 8 as a public information channel. Though used primarily to air City Council and Planning Commission meetings, these channels also serve as a community Bulletin Board. Currently KATV Channel 8 in Arvada broadcasts on a regular basis information regarding Rocky Flats public meetings. MSC has met with City of Arvada Officials to discuss how they might be able to include information on the NCPP in these updates. Further, City Officials have discussed plans to expand Channel 8 programming to include roundtable discussions on topics of interest to the community. It has been suggested the NCPP be the first such roundtable discussion. MSC is pursing this.

7.0 References

1. Rocky Flats Plant Final Environmental Impact Statement, 1980

2. Rocky Flats Plant Site Environmental Report, 1990

3. Northeast Land Use Inventory Map (Jefferson County, 1988)

4. Economic Impact of the RFP on Colorado Economy, University of Colorado at Denver, 1988

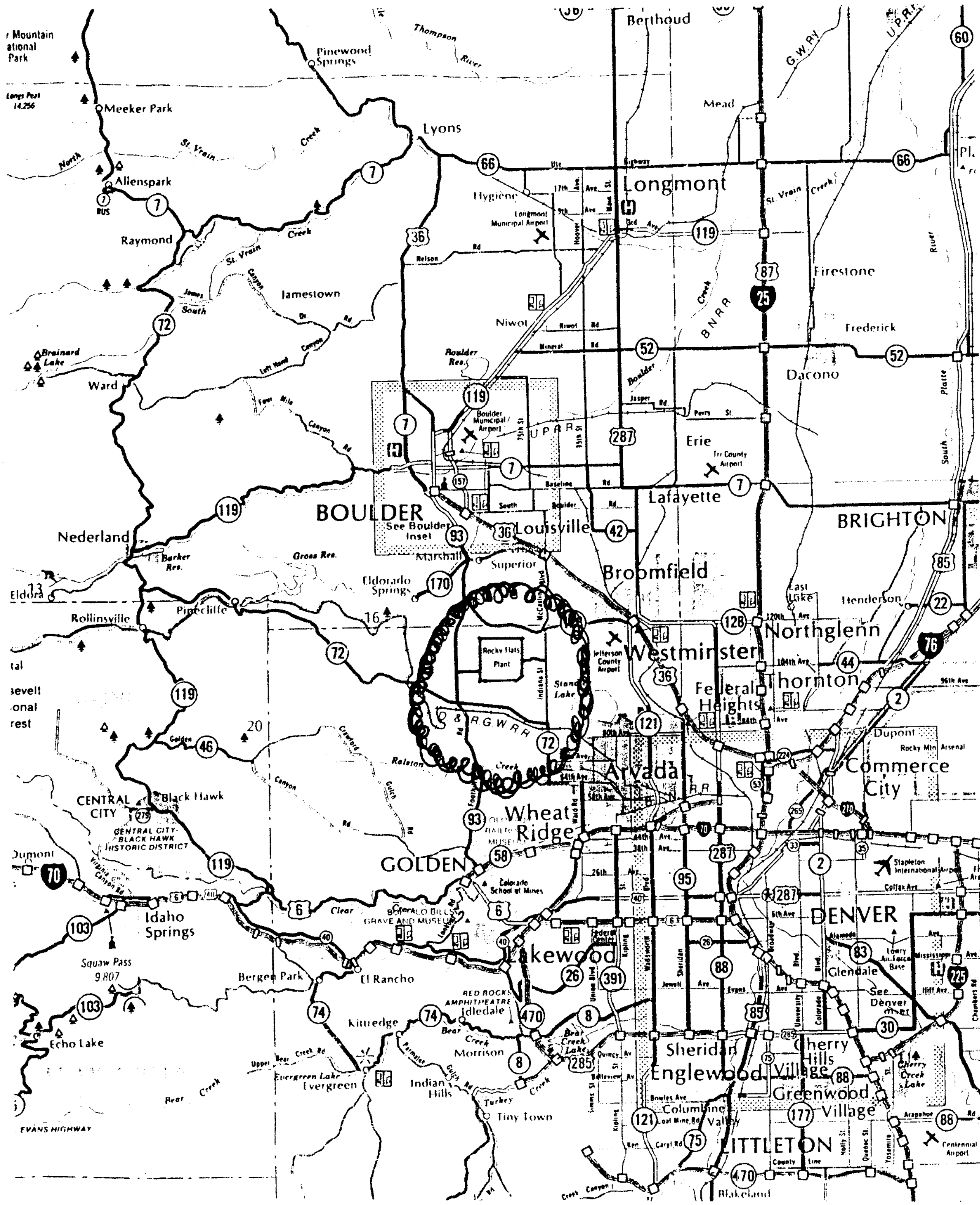
5. Rocky Flats Waste Environmental Management Systems Database

APPENDIX A

Drawings Associated with

the National Conversion Pilot Project

Location of the Rocky Flats Environmental Technology Site



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APPENDIX B

NCPP Cleanup Values

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Metals					
Aluminum (as Al metal)	*		Occupational Worker 15 mg/m^3 TWA (total dust) 5 mg/m^3 TWA (respirable fraction)	29CFR1910.1000	
Arsenic (as As)	*		Occupational Worker 0.5 mg/m^3 TWA (Organic Compounds) 10 $\mu g/m^3$ TWA (Inorganic Compounds)	29CFR1910.1000 29CFR1910.1018	Inorganic Arsenic is a Confirmed Carcinogen.
Barium (as Ba)	*		Occupational Worker 0.5 mg/m^3 TWA (soluble)	29CFR1910.1000	
Beryllium and Beryllium Compounds (as Be)	Occupational Worker 25 $\mu g/ft^2$	HSP 13.04	Occupational Worker 2 $\mu g/m^3$ TWA 5 $\mu g/m^3$ (Acceptable Ceiling Conc.) 25 $\mu g/m^3$ for 30 min. (Acceptable Max.Peak) 2 $\mu g/m^3$ TWA 0.5 $\mu g/m^3$ (action level)	29CFR1910.1000 HSP 13.03 HSP 13.04	Current Plant standard, not codified.
Cadmium (as Cd)	*		Occupational Worker 0.1 mg/m^3 TWA (fume) 0.3 mg/m^3 Ceiling (fume) 0.2 mg/m^3 TWA (dust) 0.6 mg/m^3 Ceiling (dust)	29CFR1910.1000	
Chromium	*		Occupational Worker 0.1 mg/m^3 Ceiling (as CrO_3) 0.5 mg/m^3 TWA (as Cr cmpnd.) 1 mg/m^3 TWA (as Cr as metal)	29CFR1910.1000	Hexavalent Chromium is a Confirmed Carcinogen.
Lead (as Pb)	*		Occupational Worker 30 $\mu g/m^3$ Action Level 50 $\mu g/m^3$ TWA	29CFR1910.1025	

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Lithium (as a hydride)	*		Occupational Worker 0.025 mg/m^3 TWA	29CFR1910.1000	
Silver (as Ag)	*		Occupational Worker 0.01 mg/m^3 TWA (metal & soluble compounds)	29CFR1910.1000	
Niobium (as Se) (See Remarks)	*		Occupational Worker 0.2 mg/m^3 TWA (compounds)	29CFR1910.1000	Selenium values used in place of Niobium.
Uranium (U-235&238) (α)	Occupational Worker 1,000 dpm/100 cm^2 (removable) 5,000 dpm/100 cm^2 (fixed plus removable) 1,000 dpm/100 cm^2 (removable) 5,000 dpm/100 cm^2 (average) 15,000 dpm/100 cm^2 (max.)	DOE 5480.11 Reg. Guide 1.86	Occupational Worker 0.05 mg/m^3 TWA (as U) (soluble compounds) 0.05 mg/m^3 TWA (as U) (insoluble compounds) 0.6 mg/m3 STEL (as U) (insoluble compounds) U^{235} and U^{238} $6x10^{-10}$ µCi/ml (Days) $3x10^{-10}$ µCi/ml (Weeks) $2x10^{-11}$ µCi/ml (Years) U^{235} and U^{238} (DACs) $6x10^{-10}$ µCi/ml (Days) $3x10^{-10}$ µCi/ml (Weeks) $2x10^{-11}$ µCi/ml (Years)	29CFR1910.1000 10CFR835, Appendix A DOE 5480.11 6CCR 1007-1, Pt. 4 Appendix B	

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

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SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Alpha (Trans-uranics) (α)	Occupational Worker 20 dpm/100 cm^2 (removable) 300 dpm/100 cm^2 (fixed plus removable) 20 dpm/100 cm^2 (removable) 100 dpm/100 cm^2 (average) 300 dpm/100 cm^2 (max.)	DOE 5480.11 Reg. Guide 1.86	Based upon the values for the individual Alpha emitting elements, i.e., Transuranics, Ra^{226} and Ra^{228}.		
Beta-Gamma (w/ex Sr^{90}) (β–γ)	Occupational Worker 1,000 dpm/100 cm^2 (removable) 5,000 dpm/100 cm^2 (fixed plus removable) 1,000 dpm/100 cm^2 (removable) 5,000 dpm/100 cm^2 (average) 15,000 dpm/100 cm^2 (max.)	DOE 5480.11 Reg. Guide 1.86	Based upon the values for the individual Alpha emitting elements, i.e., Th^{234}.		Sr^{90} has the same surface contamination values as Radon.

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

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SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Radon (Rn^{220}, Rn^{222}) and its daughter products	Occupational Worker 200 dpm/100 cm^2 (removable) 1,000 dpm/100 cm^2 (fixed plus removable)	DOE 5480.11	Occupational Worker Rn^{220} (Immersion DAC) $8x10^{-9}$ µCi/ml or 1.0 WL (annual average including background)	10CFR835, Appendices A&C DOE 5480.11	
	200 dpm/100 cm^2 (removable) 1,000 dpm/100 cm^2 (average) 3,000 dpm/100 cm^2 (max.)	Reg. Guide 1.86	Rn^{222} (Immersion DAC) $3x10^{-8}$ µCi/ml or 0.33 WL (annual average including background)	10CFR835, Appendices A&C DOE 5480.11	
Salts					
Cyanides (as CN)	*		Occupational Worker 5 mg/m^3 TWA	29CFR1910.1000	
Sodium Cyanide	*		Occupational Worker 5 mg/m^3 TWA (as CN only)	29CFR1910.1000	
Barium Cyanide	*		Occupational Worker 0.5 mg/m^3 TWA (as Ba soluble compounds) 5 mg/m^3 TWA (as CN)	29CFR1910.1000	
Cadmium Cyanide	*		Occupational Worker 0.1 mg/m^3 TWA (as Cd fume) 0.2 mg/m^3 TWA (as Cd dust) 0.6 mg/m^3 Ceiling (as Cd dust) 0.3 mg/m^3 Ceiling (as Cd fume) 5 mg/m^3 TWA (as CN)	29CFR1910.1000	

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Barium Chloride	*		Occupational Worker 0.5 mg/m^3 TWA (as Ba soluble compound)	29CFR1910.1000	
Solvents, Oils					
Trichloro-ethylene	*		Occupational Worker 100 ppm TWA 200 ppm Ceiling	29CFR1910.1000	
Chloro-form (Trichloro-methane)	*		Occupational Worker 2 ppm TWA 9.78 mg/m^3 TWA	29CFR1910.1000	Suspected Carcinogen
Methyl Chloro-form (1,1,1-Trichloro-ethane)	*		Occupational Worker 350 ppm TWA 1900 mg/m^3 TWA	29CFR1910.1000	
1,1,2-Trichloro-ethane	*		Occupational Worker 10 ppm TWA 45 mg/m^3 TWA	29CFR1910.1000	Protection from skin contact required.
Carbon Tetra-chloride (Tetra-chloro-methane)	*		Occupational Worker 2 ppm STEL (over 60 min) 10 ppm PEL 25 ppm Ceiling 200 ppm (5 min max)	29CFR1910.1000	Suspected Carcinogen
Ethylene Dichloride	*		Occupational Worker 1 ppm TWA 2 ppm STEL	NIOSH Pocket Guide to Chemical Hazards USDHHS	
Acetone	*		Occupational Worker 250 ppm TWA	NIOSH Pocket Guide to Chemical Hazards USDHHS	

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Benzene	*		Occupational Worker 1 ppm TWA 5 ppm in 15 min. max.	29CFR1910.1028	Confirmed Carcinogen
Toluene	*		Occupational Worker 100 ppm TWA 150 ppm STEL	NIOSH Pocket Guide to Chemical Hazards USDHHS	
Methyl Ethyl Ketone Peroxide (MEKP)	*		Occupational Worker 0.2 ppm Ceiling	NIOSH Pocket Guide to Chemical Hazards USDHHS	
Methylene Chloride (Dichloro methane)	*		Occupational Worker 500 ppm TWA 1,000 ppm Acceptable Ceiling 2,000 ppm 5 min in any 2 hrs (Acceptable Maximum Peak)	29CFR1910.1000	Suspected Carcinogen
Xylenes (m-, o- & p-isomers)	*		Occupational Worker 100 ppm TWA 150 ppm STEL	29CFR1910.1000 NIOSH Pocket Guide to Chemical Hazards USDHHS	
2-Butan-one [Methyl Ethyl Ketone (MEK)]	*		Occupational Worker 200 ppm TWA 300 ppm STEL	NIOSH Pocket Guide to Chemical Hazards USDHHS	
Perchloro-ethylene (Tetra-chloro-ethylene)	*		Occupational Worker 100 ppm TWA 200 ppm Ceiling 300 ppm (5 min max peak in any 3 hrs)	29CFR1910.1000	
Ethylene oxide (Oxirane)	*		Occupational Worker 1 ppm TWA (Permissible Exposure Limit) 5 ppm in 15 min. STEL (Excursion Limit)	29CFR1910.1047	Confirmed Carcinogen

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Di-sec octyl phthalate (Di-2-ethylhexyl - phthalate)	*		Occupational Worker 5 mg/m^3 TWA 10 mg/m^3 STEL	29CFR1910.1000 NIOSH Pocket Guide to Chemical Hazards USDHHS	
Ethylene Glycol	*		Occupational Worker 50 ppm Ceiling	NIOSH Pocket Guide to Chemical Hazards USDHHS (Not yet established)	Suspected Carcinogen
Hydrazine	*		Occupational Worker 1 ppm TWA 0.03 ppm Ceiling	29CFR1910.1000 NIOSH Pocket Guide to Chemical Hazards USDHHS	Suspected Carcinogen Protection from skin contact required.
Benzidine	*		Occupational Worker No allowable exposure limits have been defined. Exposure shall be minimized.	29CFR1910.1010	Confirmed Carcinogen
Formalde-hyde	*		Occupational Worker 0.016 ppm TWA 0.1 ppm Ceiling in 15 min. 0.75 ppm 2 ppm STEL	NIOSH Pocket Guide to Chemical Hazards USDHHS 29CFR1910.1048	Confirmed Carcinogen
Butadiene (1,3-Butadiene)	*		Occupational Worker 1,000 ppm TWA	29CFR1910.1000	Suspected Carcinogen
Penta-chloro-phenol	*		Occupational Worker 0.5 mg/m^3 TWA	29CFR1910.1000	Protection from skin contact required.
Pyridine	*		Occupational Worker 5 ppm TWA	29CFR1910.1000	

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Ethyl Alcohol (Ethanol)	*		Occupational Worker 1,000 ppm TWA	29CFR1910.1000	
Methyl Alcohol (Methanol)	*		Occupational Worker 200 ppm TWA 250 ppm STEL	29CFR1910.1000 NIOSH Pocket Guide to Chemical Hazards USDHHS	Protection from skin contact required.
			Acids		
Sulfuric Acid	*		Occupational Worker 1 mg/m^3 TWA	29CFR1910.1000	
Nitric Acid	*		Occupational Worker 2 ppm TWA 4 ppm STEL	29CFR1910.1000 NIOSH Pocket Guide to Chemical Hazards USDHHS	
Hydro-chloric Acid (Hydrogen Chloride)	*		Occupational Worker 5 ppm Ceiling	29CFR1910.1000	
Hydro-fluoric Acid (as F) (Hydrogen Fluoride)	*		Occupational Worker 3 ppm TWA 6 ppm Ceiling	29CFR1910.1000 NIOSH Pocket Guide to Chemical Hazards USDHHS	Etchant Solution
Chromic Acid and Chromates	*		Occupational Worker 0.1 mg/m^3 Ceiling (as CrO_3) 0.001 mg/m^3 TWA (as Cr)	29CFR1910.1000 NIOSH Pocket Guide to Chemical Hazards USDHHS	Plating Solution

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Bases					
Sodium Hydroxide	*		Occupational Worker 2 mg/m^3	29CFR1910.1000	
Potassium Hydroxide	*		Occupational Worker 2 mg/m^3	NIOSH Pocket Guide to Chemical Hazards USDHHS	
Aluminum Sulfate	*		Occupational Worker 2 mg/m^3 TWA (as Al)	NIOSH Pocket Guide to Chemical Hazards USDHHS	
Nickel Carbonyl	*		Occupational Worker 0.001 ppm TWA	29CFR1910.1000	
Miscellaneous Chemicals/Particulates					
Asbestos	*		Occupational Worker 0.1 fiber/cc TWA 1 fiber/cc in 30 min. period (Excursion Limit)	29CFR1910.1001	Confirmed Carcinogen
Fuel, Fuel Oils, Oils and Oil Sludges	*		Occupational Worker		
Gasoline			Limits no longer appear in the Table Z-1-A list. NIOSH considers it a potential occupational carcinogen.	29CFR1910.1000	
Oil Mist, Mineral			5 mg/m^3 TWA	29CFR1910.1000	

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Inert Particulate Material			Occupational Worker 50 mg/m^3 TWA (total dust) 15 mg/m^3 TWA (respirable fraction)	29CFR1910.1000	
PCBs	Occupational Worker High-Contact Areas, and Low-Contact Indoor Impervious & Non-Impervious Surfaces 10 mg/100 cm^2 Encapsulated Low-Contact Indoor Impervious Surfaces 100 mg/100 cm^2	OSHA	Occupational Worker 0.5 mg/m^3 ChlorodiphenylTWA (54% chlorine) 1 mg/m^3 Chlorodiphenyl TWA (42% chlorine)	29CFR1910.1000	Protection from skin contact required.
DDT (Dichlorodiphenyltri-chloroethane)	*		Occupational Worker 1 mg/m^3 TWA	29CFR1910.1000	Protection from skin contact required.

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Radionuclides					
Uranium (U-235&238) (α)	Occupational Worker 1,000 dpm/100 cm^2 (removable) 5,000 dpm/100 cm^2 (fixed plus removable) 1,000 dpm/100 cm^2 (removable) 5,000 dpm/100 cm^2 (average) 15,000 dpm/100 cm^2 (max.)	DOE 5480.11 Reg. Guide 1.86	Occupational Worker 0.05 mg/m^3 TWA (as U) (soluble compounds) 0.2 mg/m^3 TWA (as U) (insoluble compounds) 0.6 mg/m3 STEL (as U) (insoluble compounds) U^{235} and U^{238} $6x10^{-10}$ μCi/ml (very soluble) $3x10^{-10}$ μCi/ml (soluble) $2x10^{-11}$ μCi/ml (insoluble) U^{235} and U^{238} (DACs) $6x10^{-10}$ μCi/ml (very soluble) $3x10^{-10}$ μCi/ml (soluble) $2x10^{-10}$ μCi/ml (insoluble)	29CFR1910.1000 10CFR835, Appendix A DOE 5480.11 6CCR 1007-1, Pt. 4 Appendix B	

*In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Alpha (Transuranics) (α)	Occupational Worker 20 dpm/100 cm^2 (removable) 300 dpm/100 cm^2 (fixed plus removable) 20 dpm/100 cm^2 (removable) 100 dpm/100 cm^2 (average) 300 dpm/100 cm^2 (max.)	DOE 5480.11 Reg. Guide 1.86	Based upon the values for the individual Alpha emitting elements, i.e., Transuranics, Ra^{226} and Ra^{228}.		
Beta-Gamma (w/ex Sr^{90}) (β–γ)	Occupational Worker 1,000 dpm/100 cm^2 (removable) 5,000 dpm/100 cm^2 (fixed plus removable) 1,000 dpm/100 cm^2 (removable) 5,000 dpm/100 cm^2 (average) 15,000 dpm/100 cm^2 (max.)	DOE 5480.11 Reg. Guide 1.86	Based upon the values for the individual Alpha emitting elements, i.e., Th^{234}.		Sr^{90} has the same surface contamination values as Radon.

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

SUBSTANCE	SURFACE LIMITS	SOURCE	AIR LIMITS	SOURCE	REMARKS
Radon (Rn^{220}, Rn^{222}) and its daughter products	Occupational Worker 200 dpm/100 cm^2 (removable) 1,000 dpm/100 cm^2 (fixed plus removable)	DOE 5480.11	Occupational Worker Rn^{220} (Immersion DAC) $8x10^{-9}$ μCi/ml or 1.0 WL (annual average including background)	10CFR835, Appendices A&C DOE 5480.11	
	200 dpm/100 cm^2 (removable) 1,000 dpm/100 cm^2 (average) 3,000 dpm/100 cm^2 (max.)	Reg. Guide 1.86	Rn^{222} (Immersion DAC) $3x10^{-8}$ μCi/ml or 0.33 WL (annual average including background)	10CFR835, Appendices A&C DOE 5480.11	

Abbreviations:

DAC = Derived Air Concentration

IAW = In Accordance With

PEL = Permissible Exposure Limit

STEL = Short Term Exposure Limit

TWA = Time Weight Average (over an 8 hour workshift)

WL = Working Level (100 ρCi/l)

* In the event that this COC is identified as being present, the surface will be cleaned to a reasonably achievable level according to the ALARA principle.

APPENDIX C

Decision Trees for NCPP Stage II

Cleanup Contingencies

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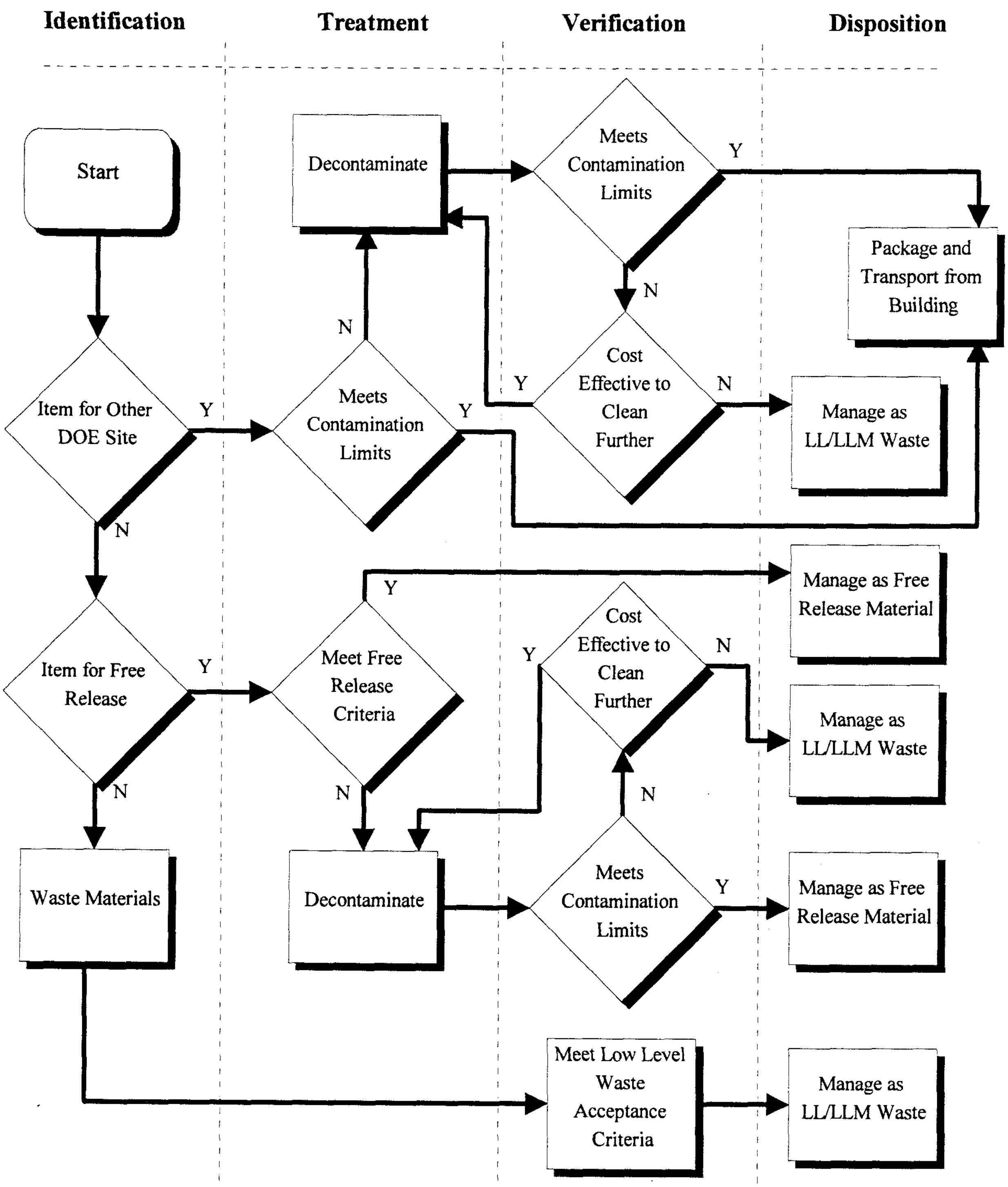
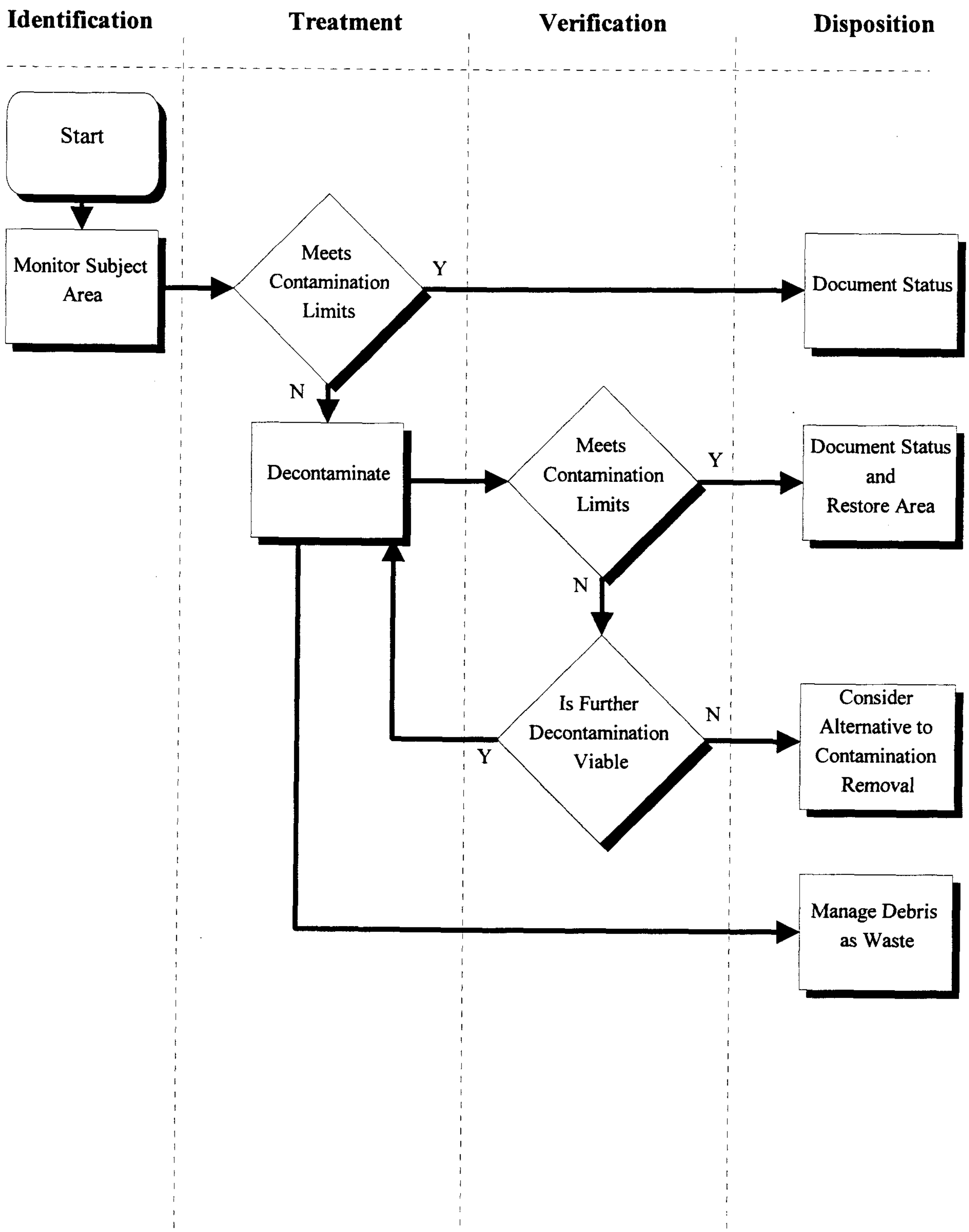
Step 1: Removal of Waste/Unwanted Equipment



Step 2: Cleaning of High Contamination Areas



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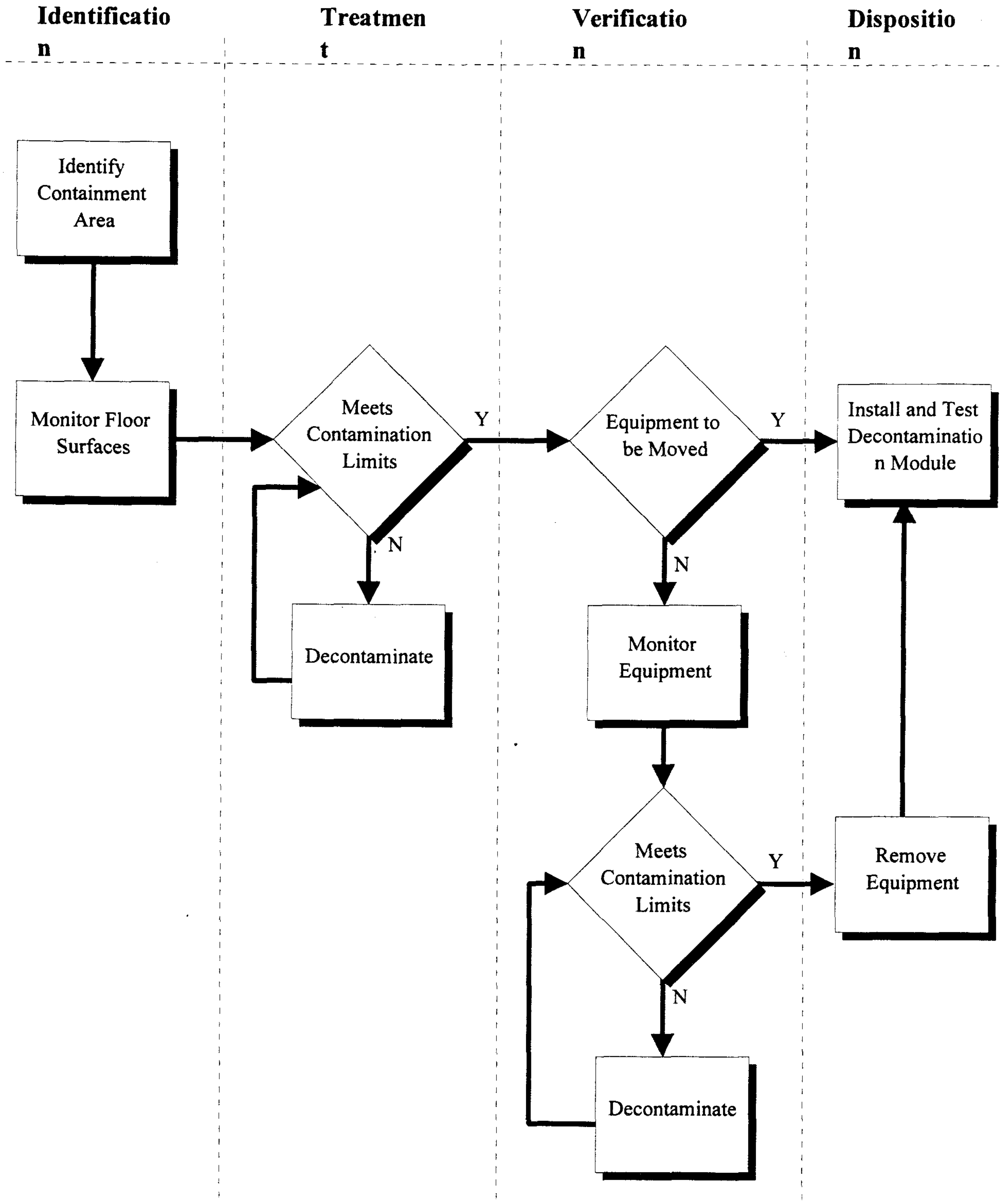
Step 3: Build Decontamination Facility



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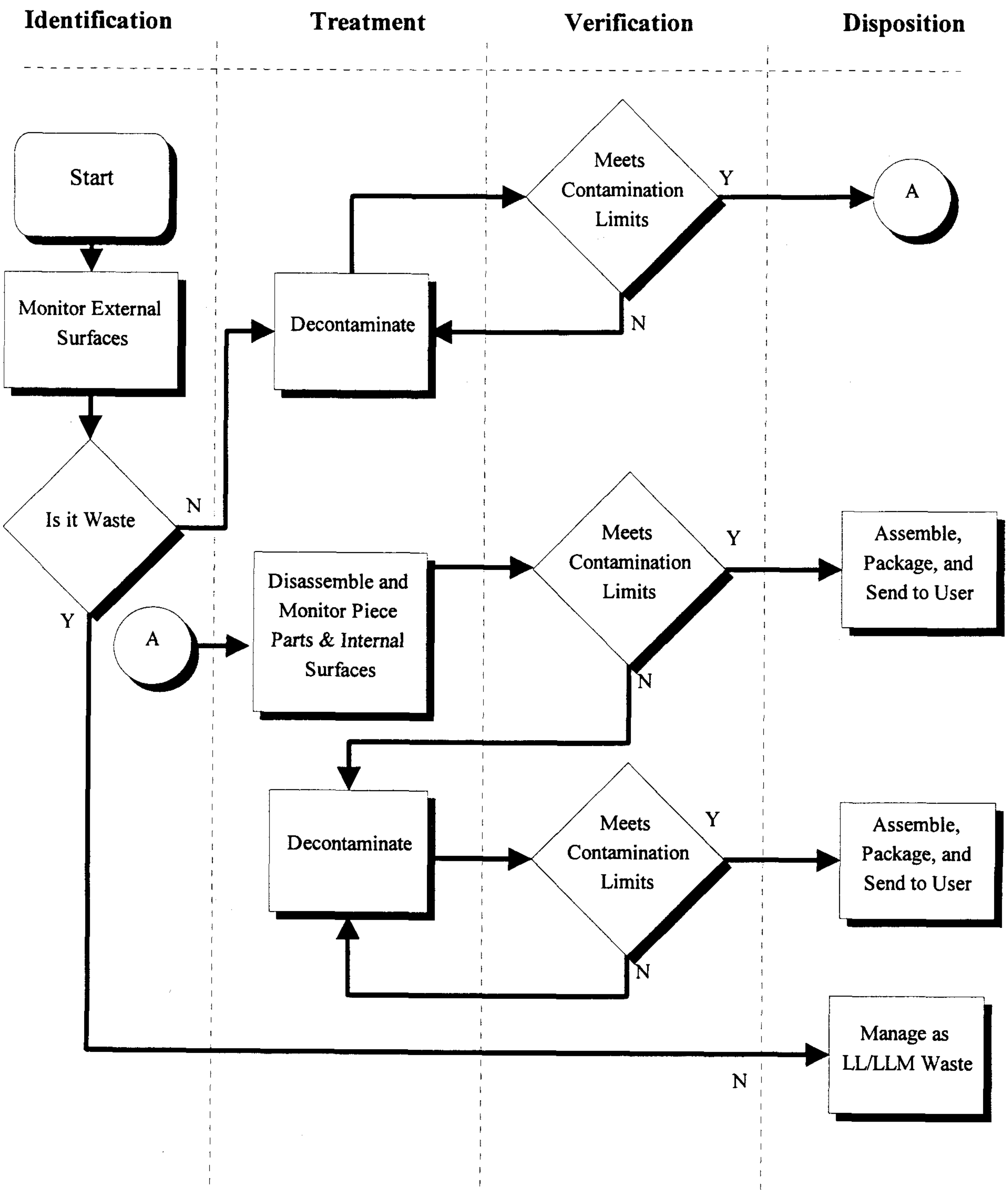
Step 4: Removal and Decontamination of Low Contaminated Items of Equipment and Furnishings



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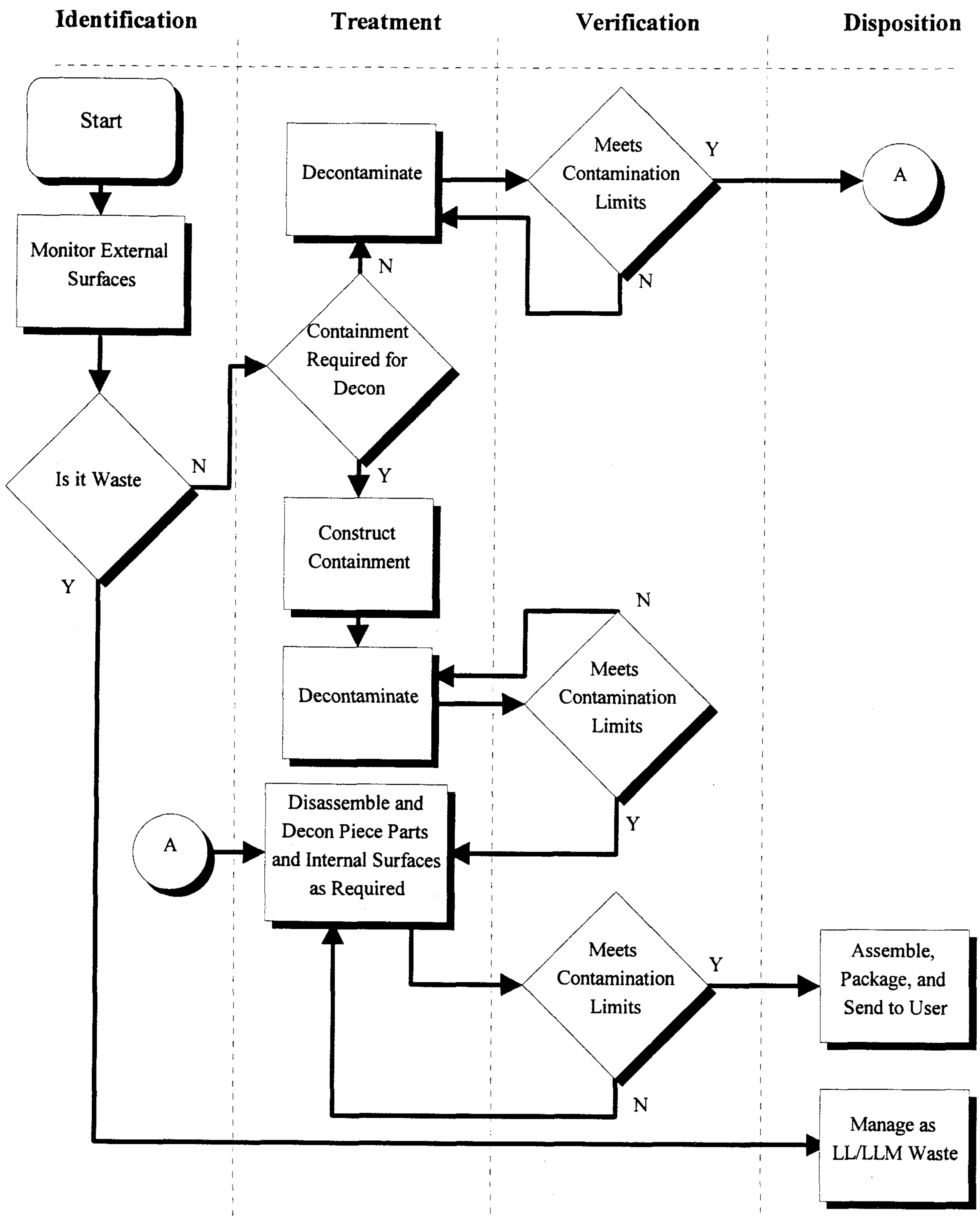
Step 5: Removal and Decontamination of Highly Contaminated Items of Equipment and Furnishings



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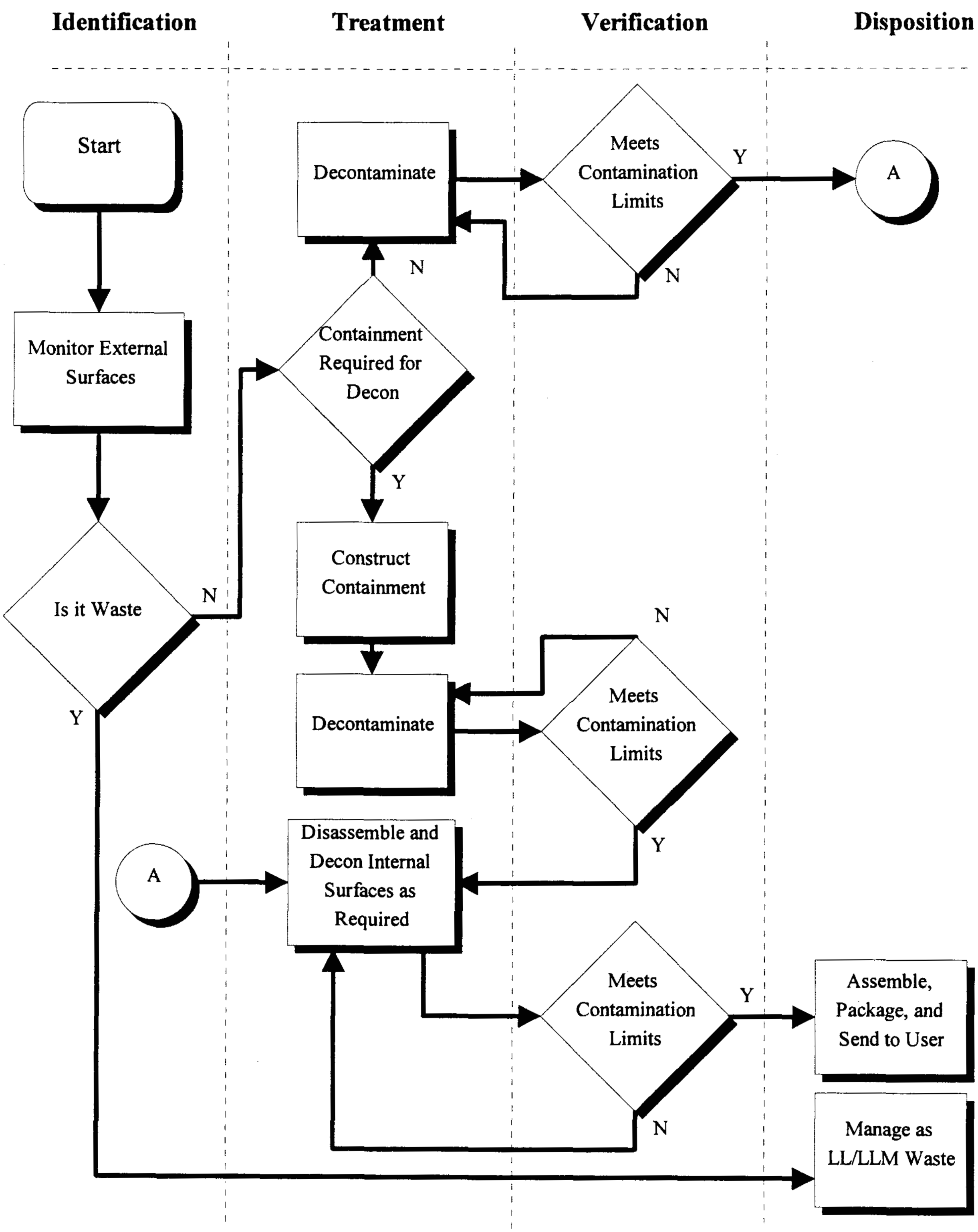
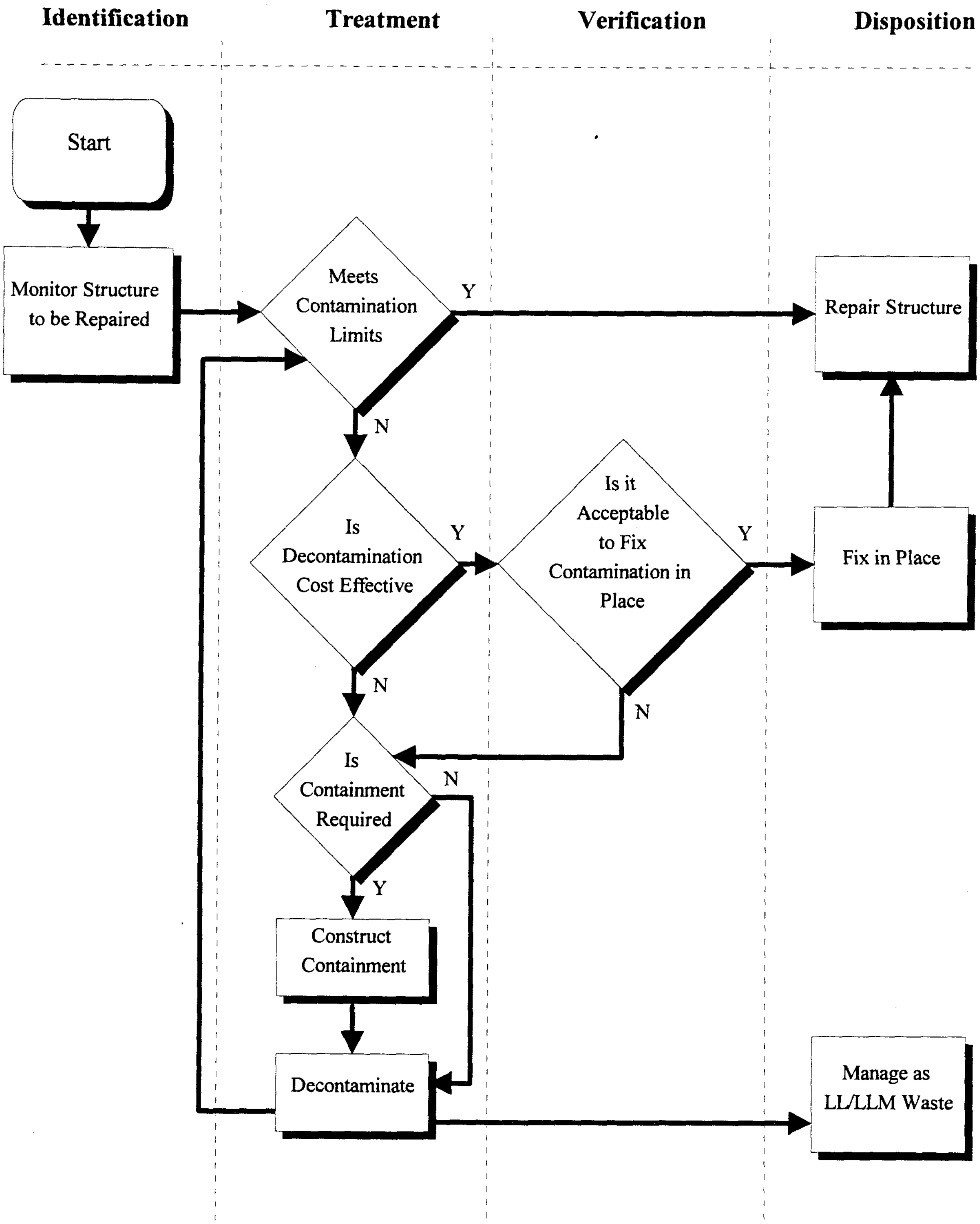
Step 6: Decontamination, Dismantling, and Removal of Services



Step 7: Repairs to Structure Following Removal of Equipment



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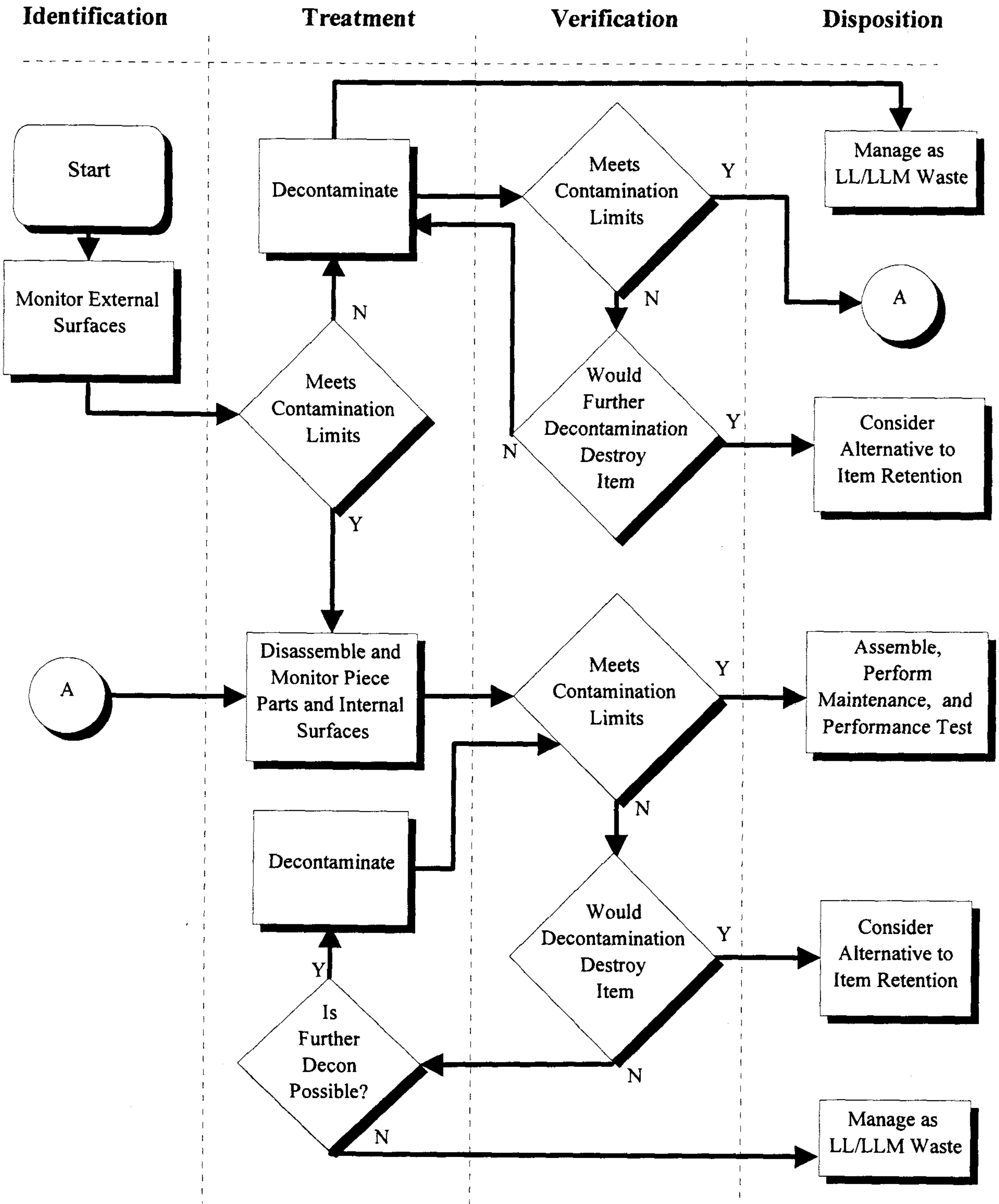
Step 8: Dismantling, Decontamination, and Reassembly of Retained Equipment Considered to be a Low Contamination Risk



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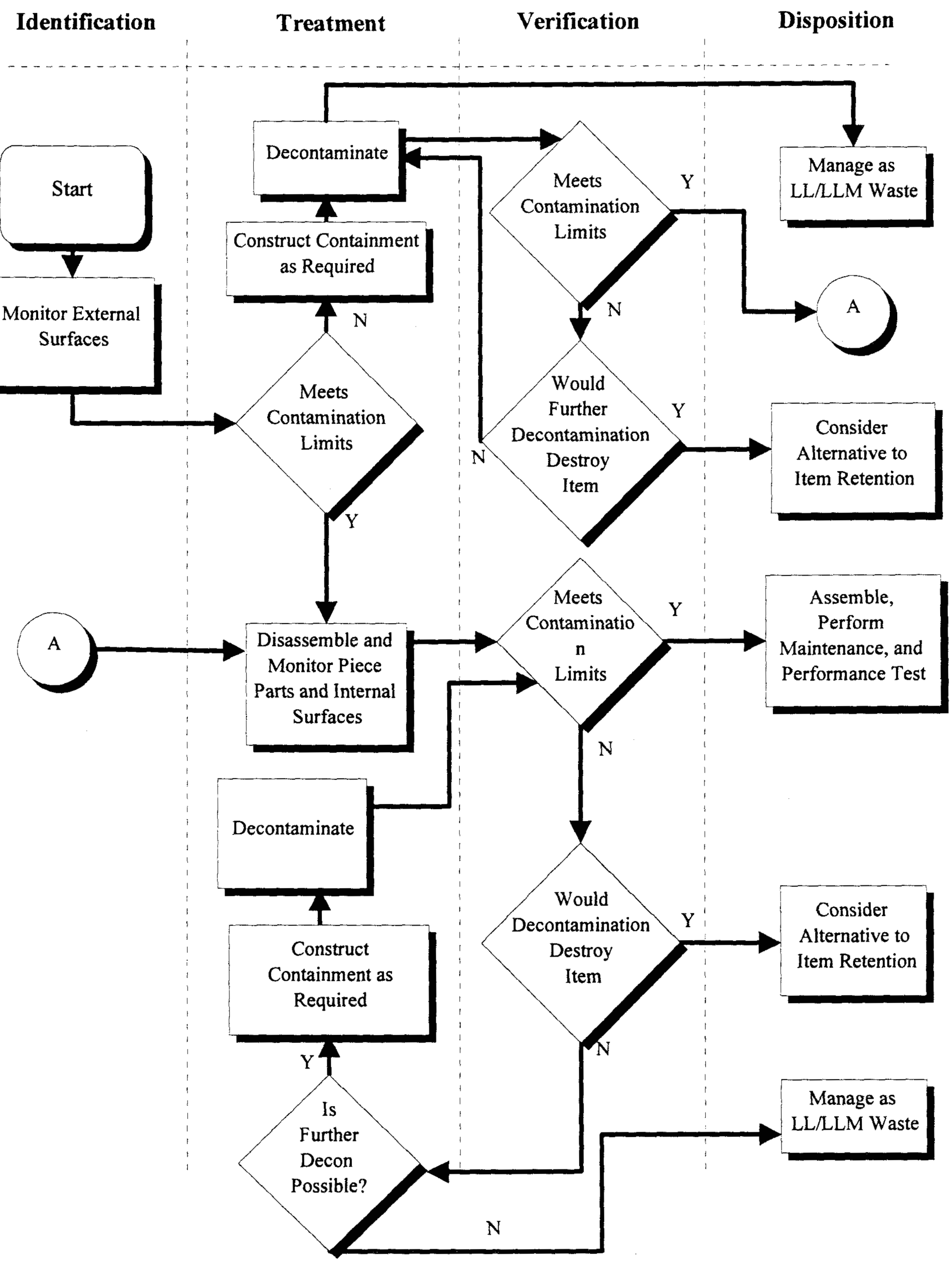
Step 9: Dismantling, Decontamination, and Reassembly of Retained Equipment Considered to be a High Contamination Risk



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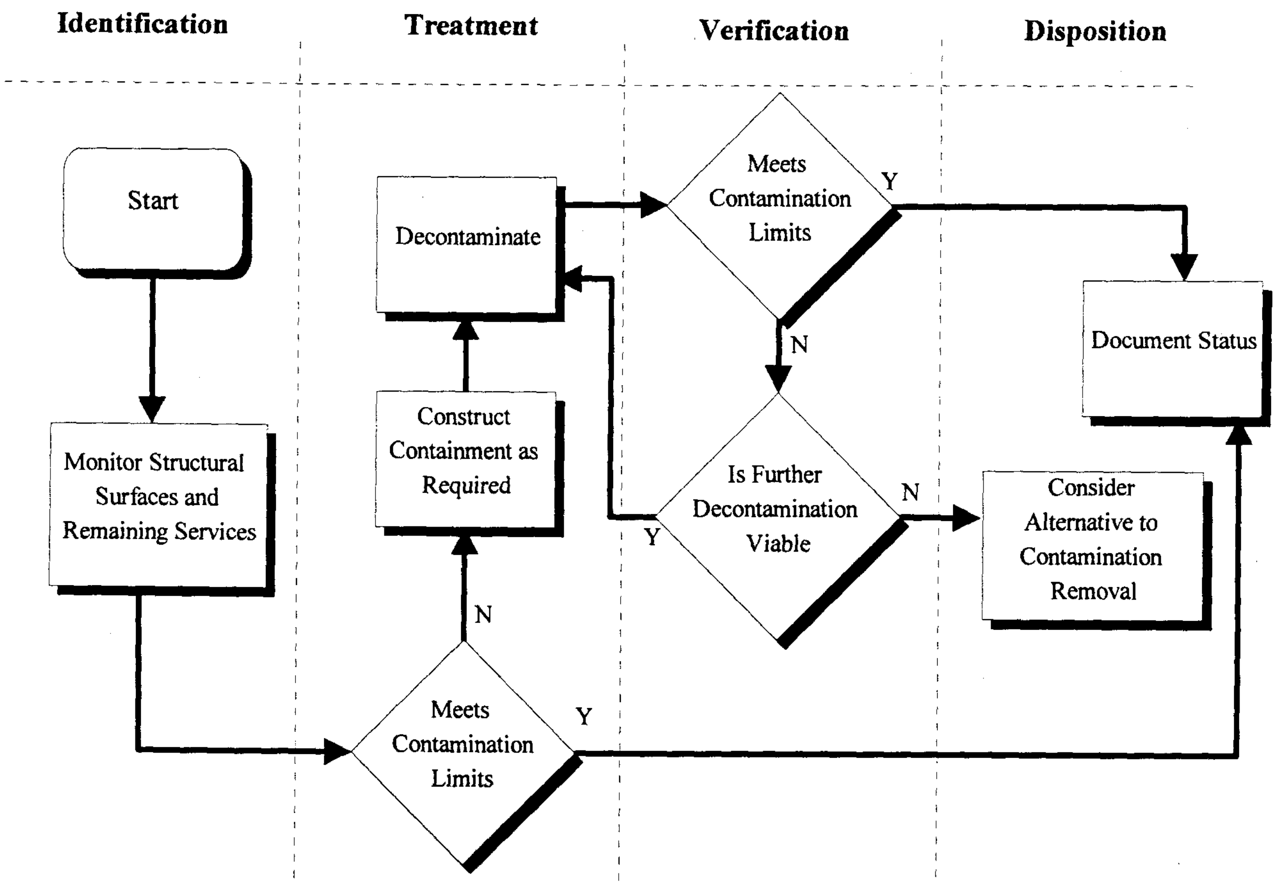
Step 10: Final Decontamination of Building to Operational Levels



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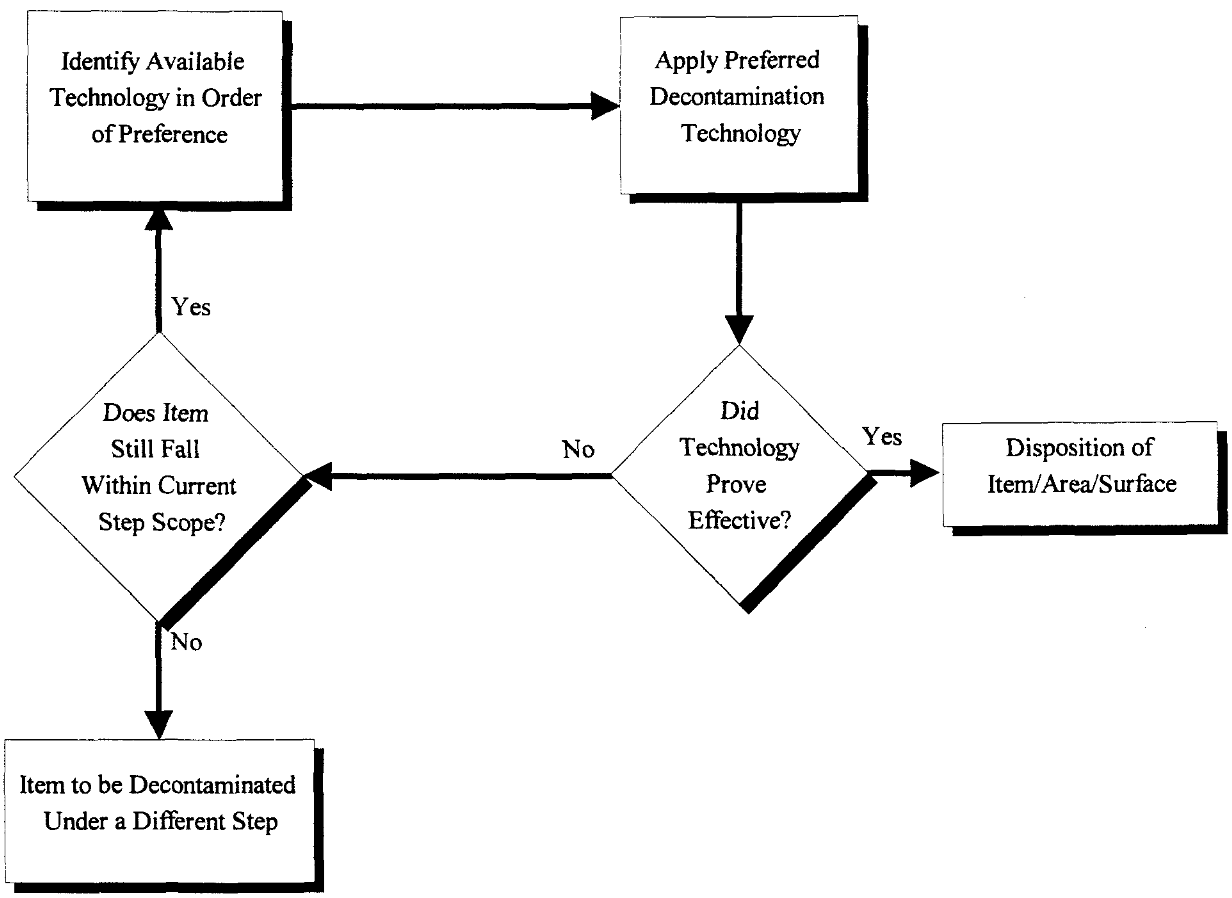
Decontamination Logic Diagram



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APPENDIX D

Decontamination Technique/Application Matrix

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Decontamination Technique/Application Matrix

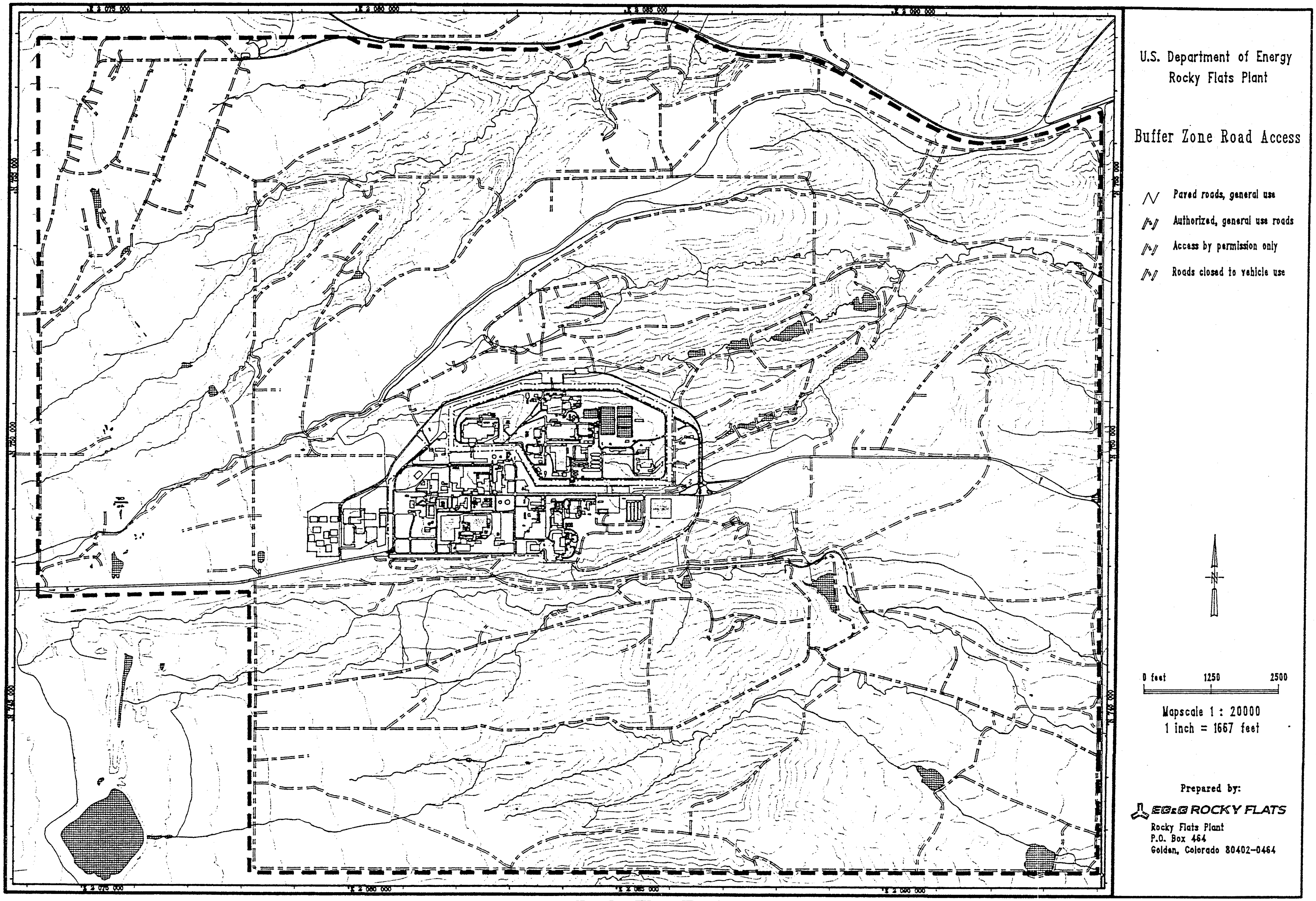
	Washing, wiping & scrubbing	Vacuum cleaning	Paint stripping	CO_2 blasting	High Pressure Water/ steam cleaning	Foam decontaminants	Grit blasting	Grinding & Scabbling	Chemical decontam-ination	Electro-polishing	Ultrasonic cleaning	Strippable coatings[1,2]	Modular containments/ PVC tenting[2]	Exit showers/ water cleanup systems[2]	Foam filling[2]
STEP 1 Loose waste unwanted equipment office type, tools and ancillary	1	3	5	6	N	N	4	N	N	7	2	N	N	N	N
STEP 2 Clean areas of high contamination	2	1	5	N	6	3	N	4	P	N	N	N	1	1	N
STEP 3 Assembly of Decontamination Facility	N	N	N	N	N	N	N	N	N	N	N	Y	N	Y	N
STEP 4 "Clean" equipment for removal	1	5	6	2	N	8	7	9	N	4	3	P	N	N	N
STEP 5 "Contaminated" equipment for removal	1	P	2	4	P	P	P	P	N	P	Y	Y	Y	P	N
STEP 6 "Clean" equipment to stay	1	3	4	7	N	N	5	6	N	2	N	N	N	N	N
STEP 7 "Contaminated" equipment to stay	1	2	3	P	4	5	N	7	N	N	6	Y	Y	Y	N
STEP 8 Remove services	1	2	3	7	6	5	N	4	N	N	N	P	P	P	Y
STEP 9 Structural repair	1	2	3	N	5	6	N	4	7	N	N	P	P	P	N
STEP 10 Final building decontamination and decontaminate tools used in decontamination	B-1 T-1	B-2 T-2	B-3 T-N	B-6 T-3	B-4 T-4	B-4 T-N	B-5 T-5	B-4 T-4	B-7 T-N	B-8 T-5	B-8 T-4	B-4 T-N	B-1 T-P	B-1 T-P	N

[1] Strippable coatings could be used to remove contamination or avoid the spread of contamination by applying this product around area to be decontaminated.
[2] These are not direct decontamination methods, but aids in the decontamination process.

Y = Yes, N = No, P = Possibly or has potential

Numbers represent preferred order of application with 1 being first and 10 last.

In Step 10, B & number is for building decontamination; T & number is for tool decontamination.



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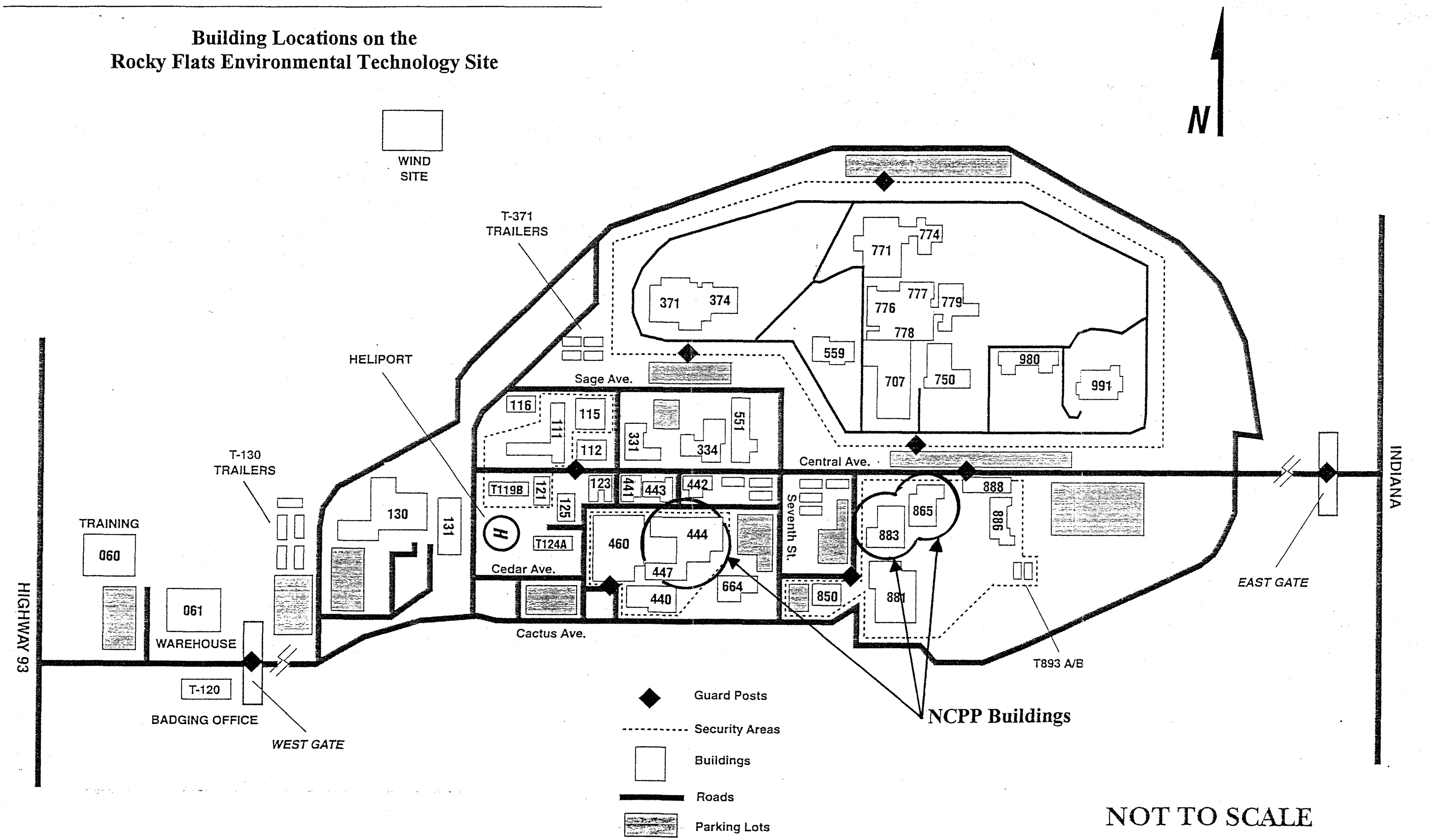
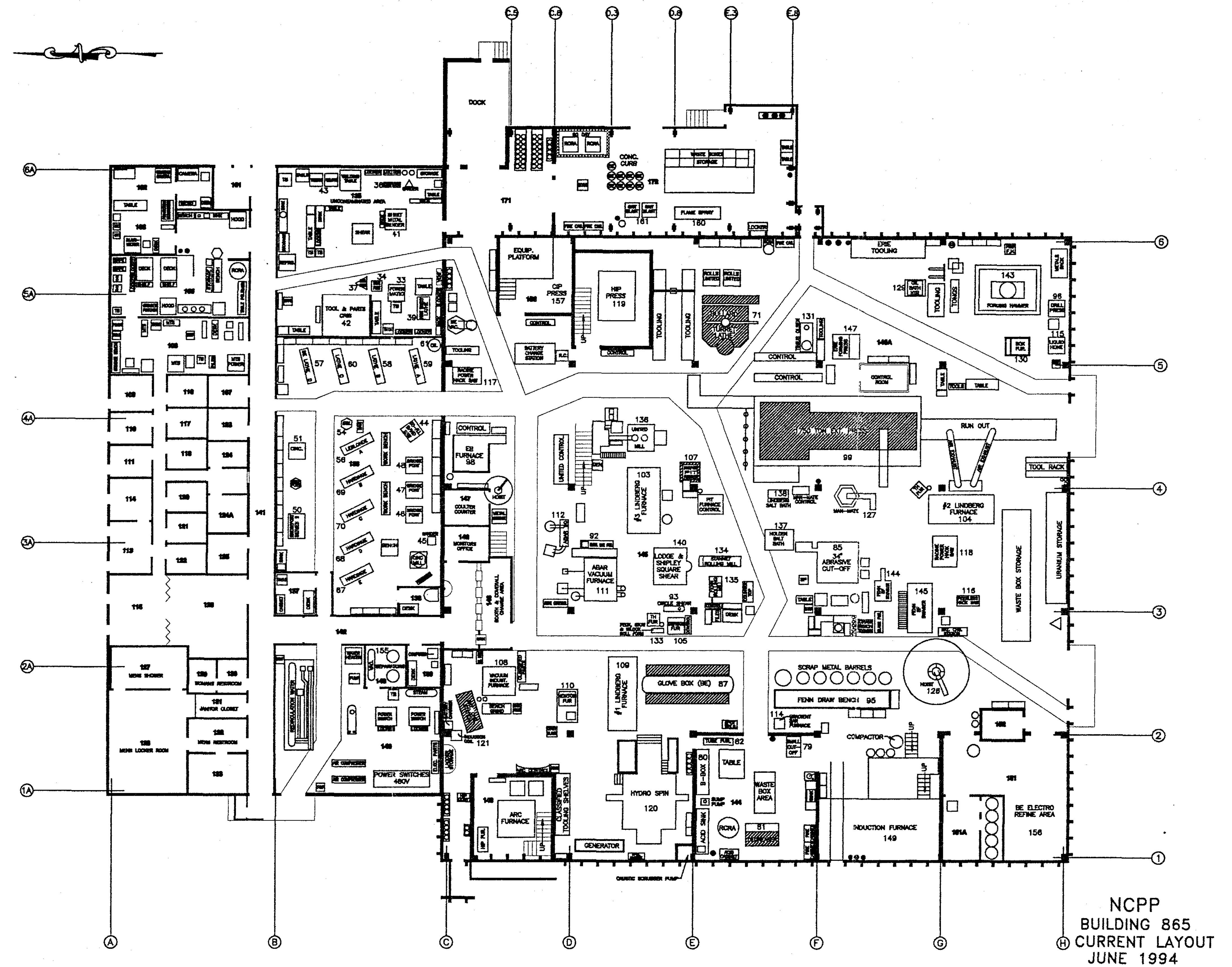
Rocky Flats Environmental Technology Site Boundaries and Buffer Zone

Building Locations on the Rocky Flats Environmental Technology Site



Building Locations on Rocky Flats Environmental Technology Site



NCPP
BUILDING 865
CURRENT LAYOUT
JUNE 1994
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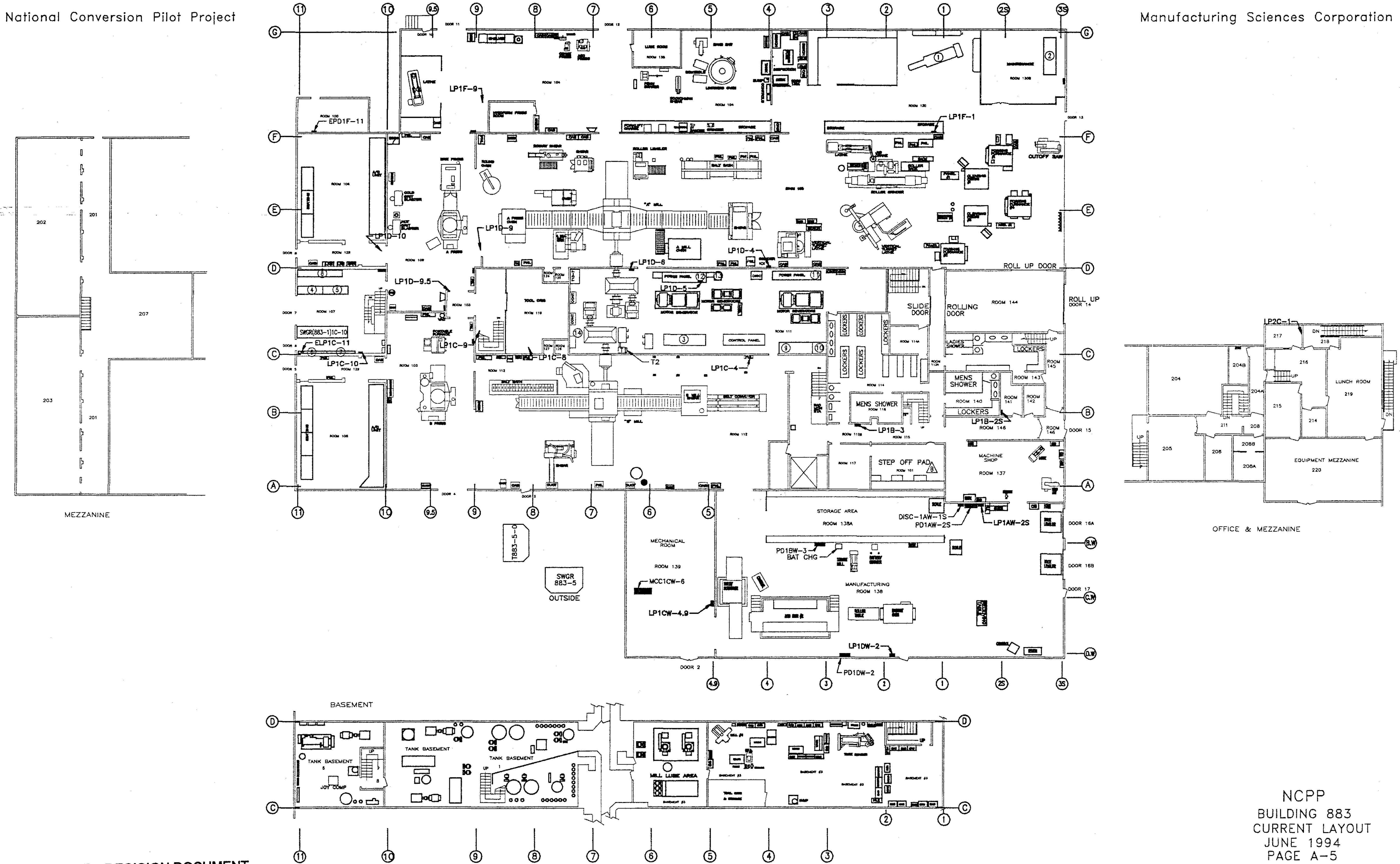
National Conversion Pilot Project

Manufacturing Sciences Corporation



NCPP
BUILDING 883
CURRENT LAYOUT
JUNE 1994
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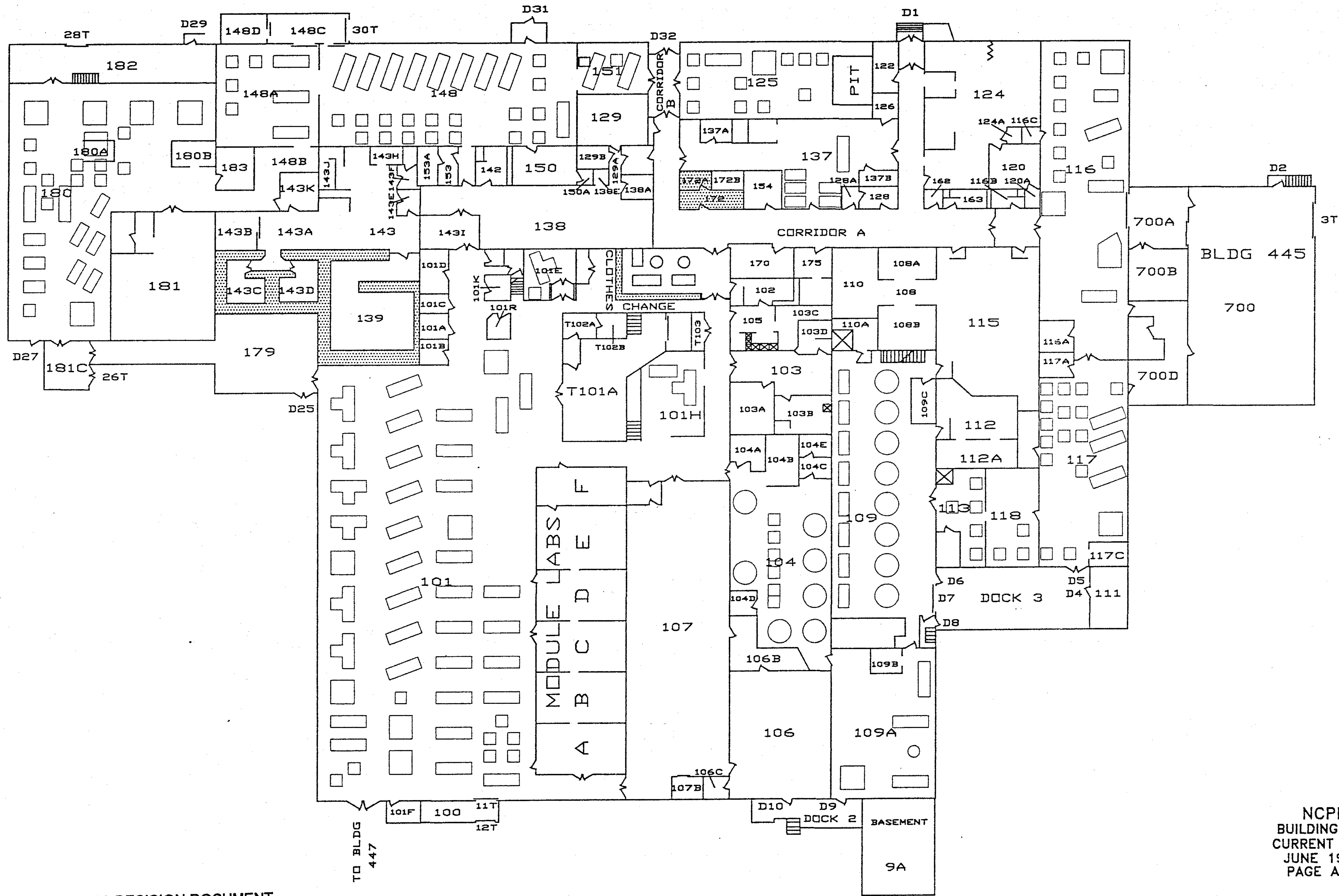
National Conversion Pilot Project

Manufacturing Sciences Corporation



NCPP
BUILDING 444
CURRENT LAYOUT
JUNE 1994
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NCPP - IM/IRA DECISION DOCUMENT

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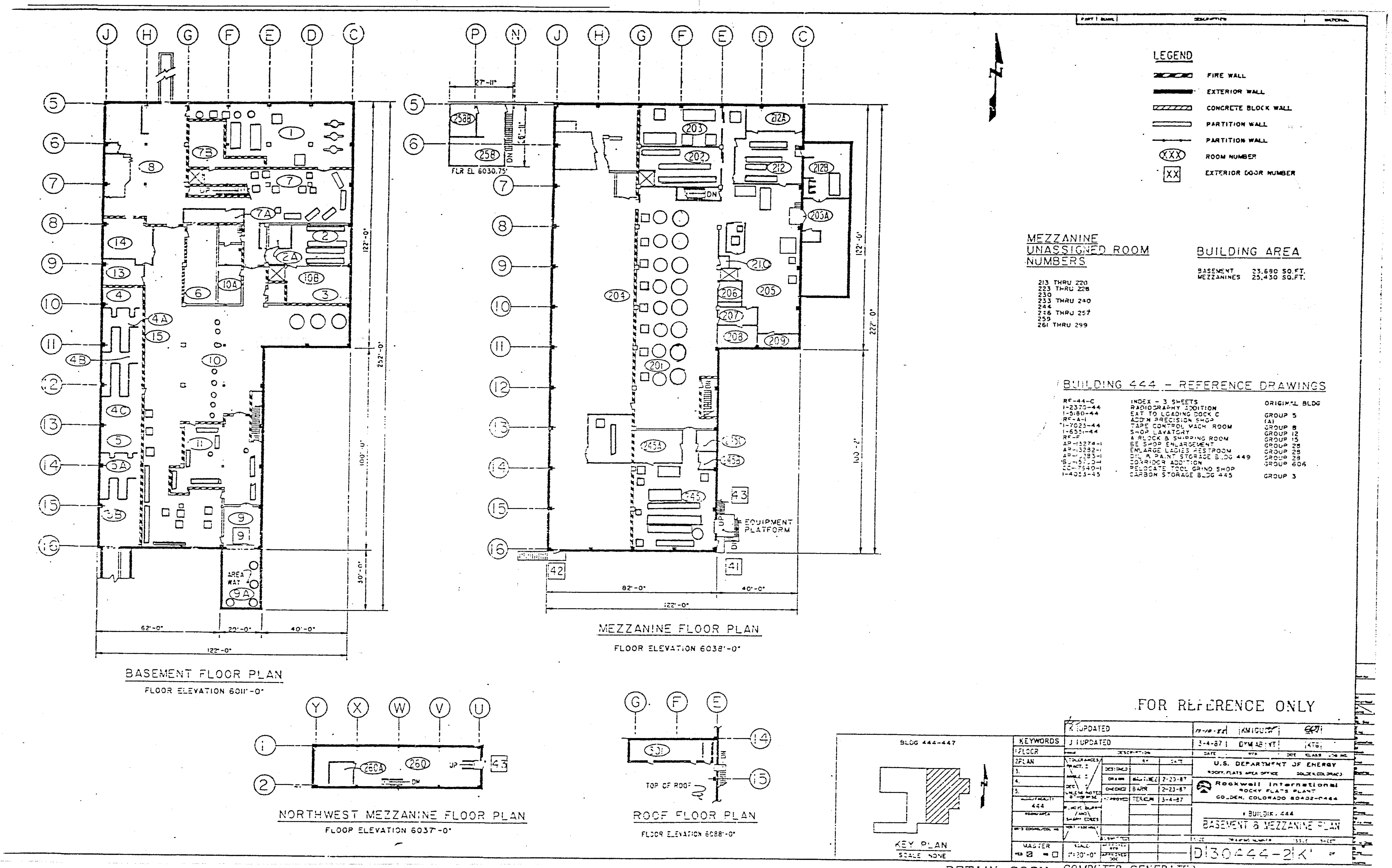
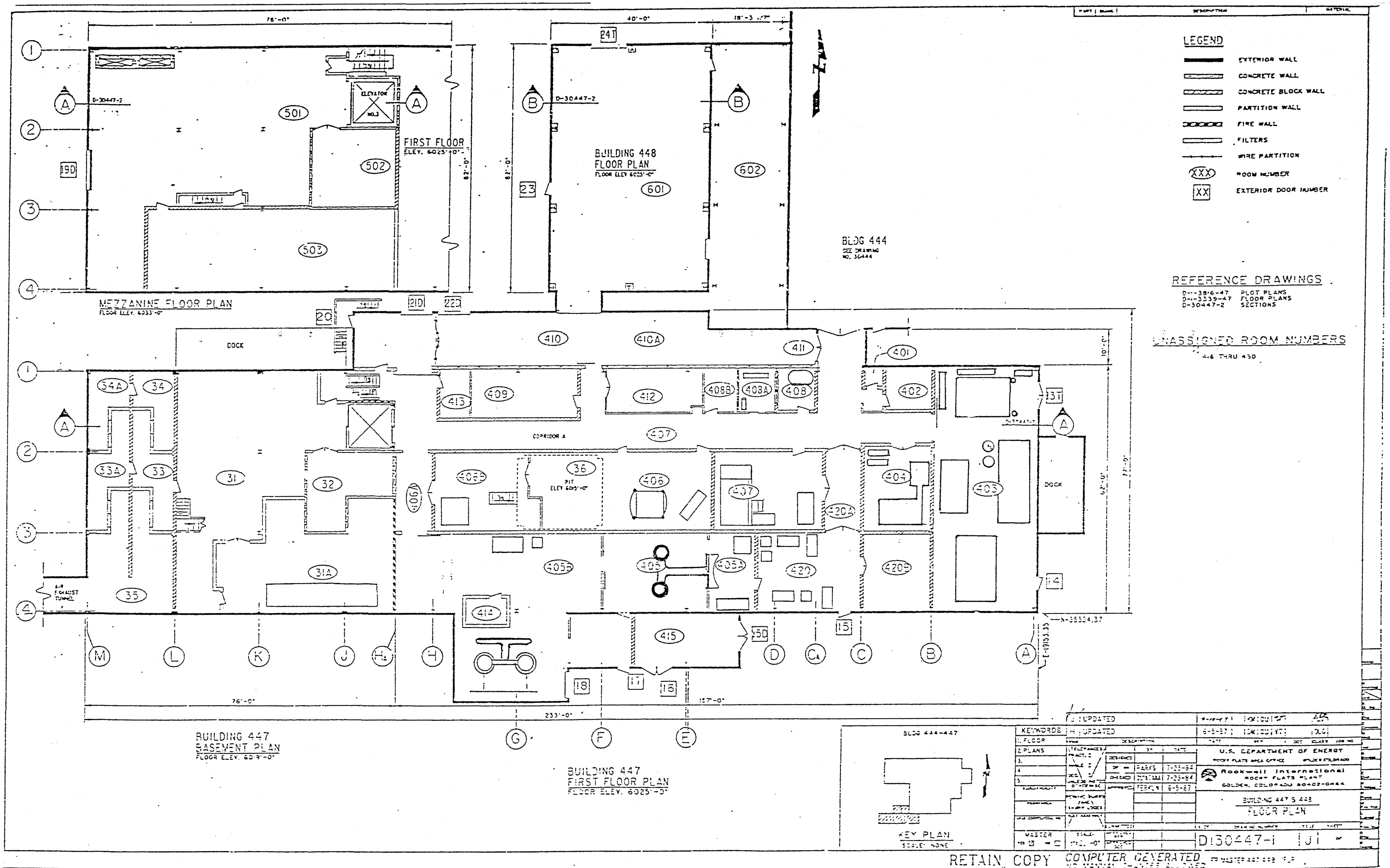


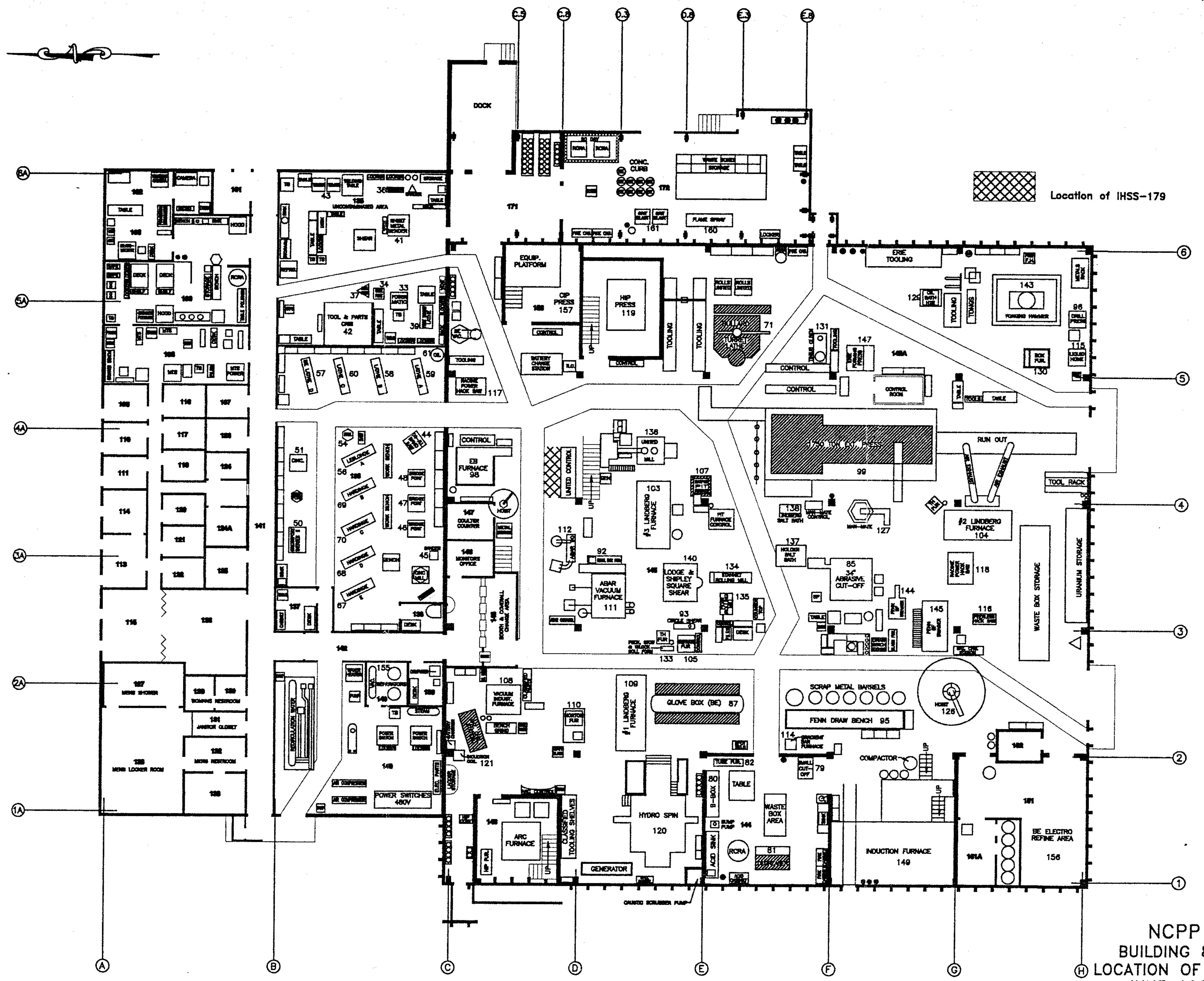
Building 444 Basement & Mezzanine, Current Layout **Page A-7**



Building 447, Current Layout

National Conversion Pilot Project

Manufacturing Sciences Corporation



NCPP
BUILDING 865
LOCATION OF IHSS-179
JUNE 1994
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NCPP - IM/IRA DECISION DOCUMENT

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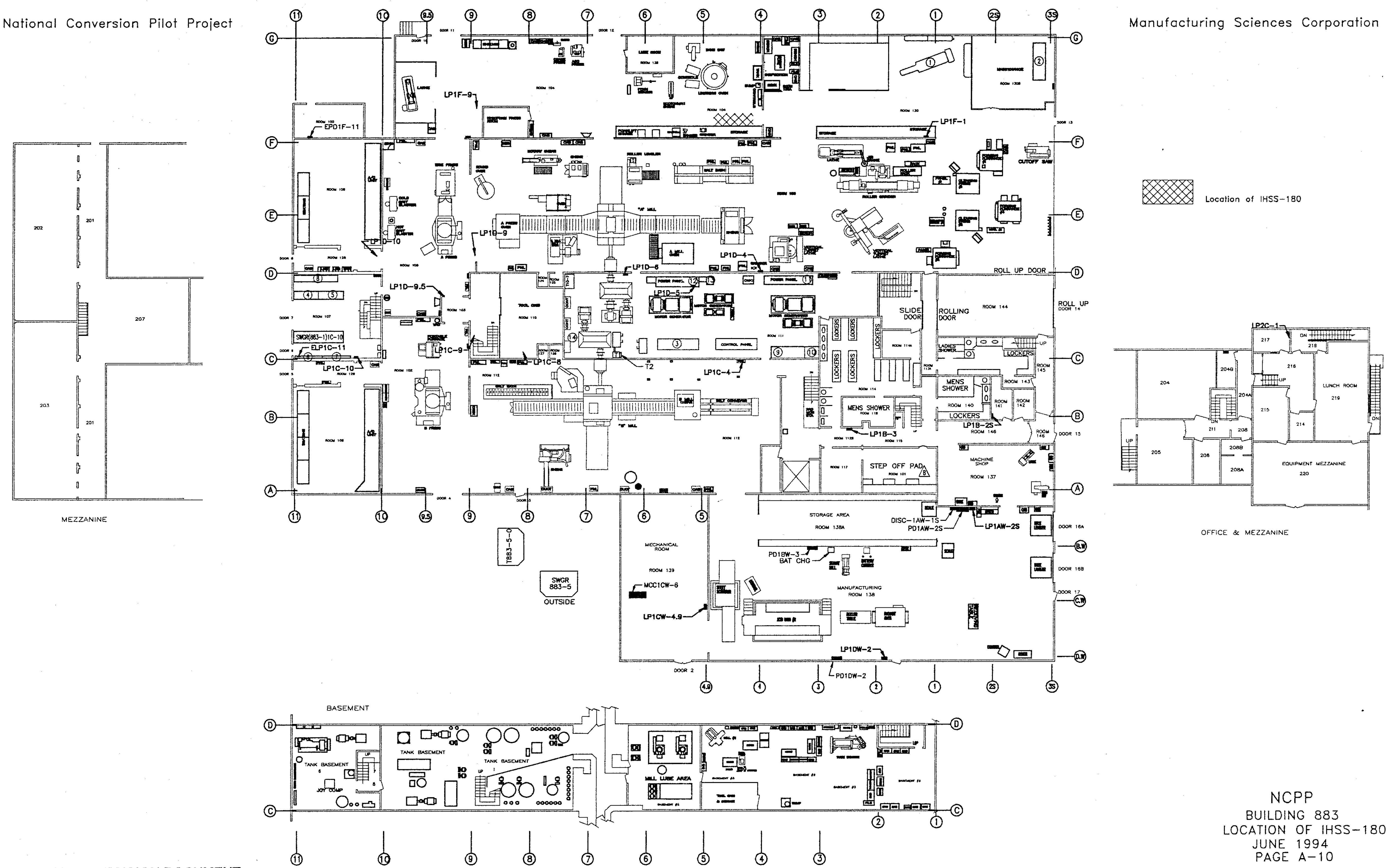
National Conversion Pilot Project

Manufacturing Sciences Corporation



NCPP
BUILDING 883
LOCATION OF IHSS-180
JUNE 1994
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NCPP - IM/IRA DECISION DOCUMENT

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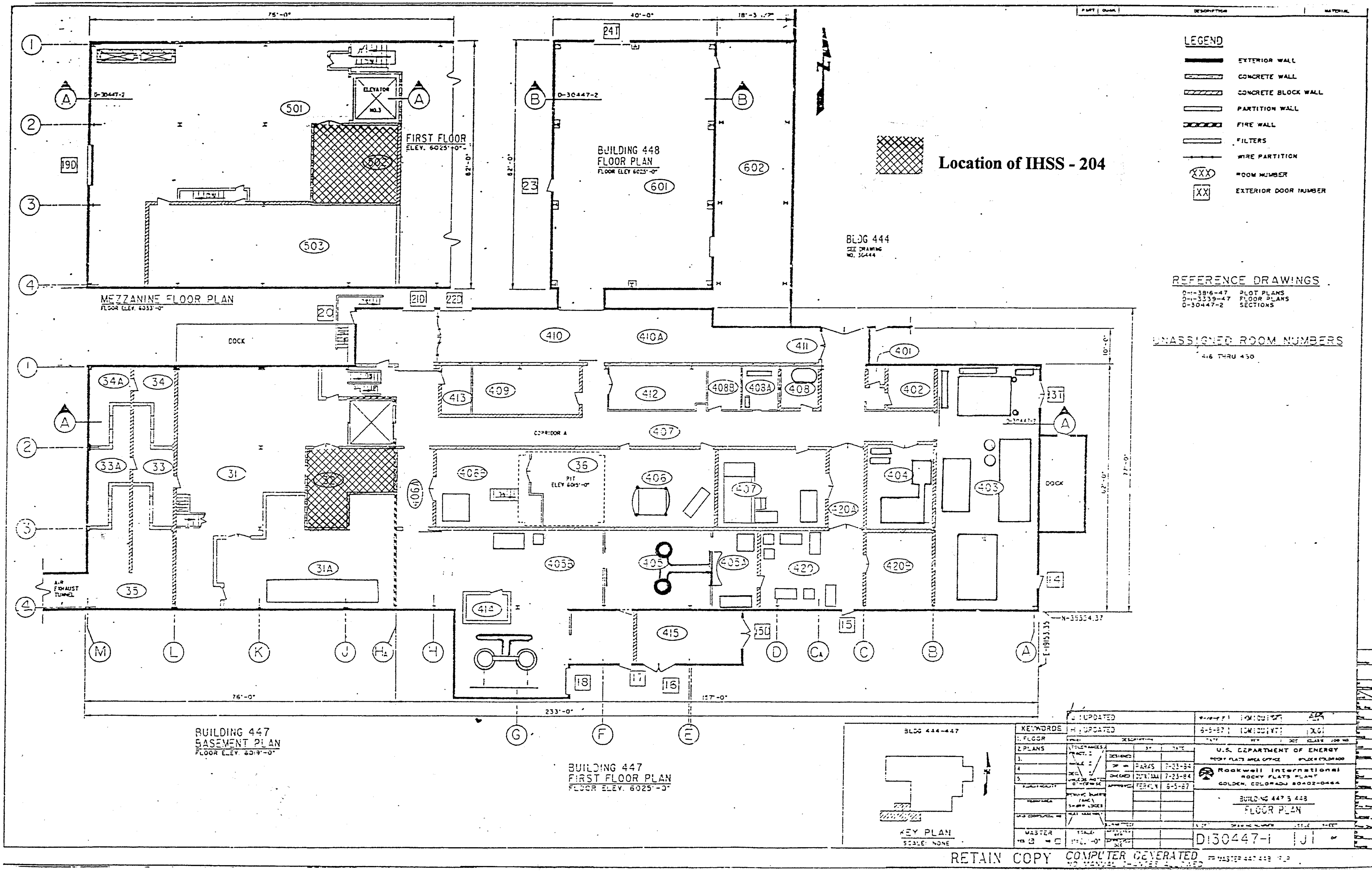
Location of IHSS - 204
LEGEND
EXTERIOR WALL
CONCRETE WALL
CONCRETE BLOCK WALL
PARTITION WALL
FIRE WALL
FILTERS
WIRE PARTITION
ROOM NUMBER
EXTERIOR DOOR NUMBER
REFERENCE DRAWINGS
UNASSIGNED ROOM NUMBERS
416 THRU 430
MEZZANINE FLOOR PLAN
FIRST FLOOR
BUILDING 448
FLOOR PLAN
BLDG 444
DOCK
CORRIDOR A
BUILDING 447
BASEMENT PLAN
BUILDING 447
FIRST FLOOR PLAN
KEY PLAN
U.S. DEPARTMENT OF ENERGY
Rockwell International
ROCKY FLATS PLANT
GOLDEN, COLORADO
BUILDING 447 & 448
FLOOR PLAN
D-30447-1
RETAIN COPY
COMPUTER GENERATED

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